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Attitudes of the Faculties of Higher Education Institutions towards Biometric Attendance Maintenance System : An Empirical Study

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Abstract:

Biometric attendance systems have gained significant attention in higher educational institutions due to their potential to streamline attendance management processes and minimize fraudulent attendance practices. Biometric attendance technique is more secured than traditional or manual attendance system. It is revealed from the study that majority of the people are already well aware about the biometric technologies in comparison to the traditional IT security methods. To the respondents biometric attendance maintenance system is important to control workers. This implies that there are some of changes controlling and looking over employees after biometric attendance system is being implemented. It is revealed that employees are feeling comfortable in using biometric machine for attendance purpose. Using or even touching the biometric machine for attendance does not discourage or discomfort the workers. But, still there are some respondents who are not feeling happy in the presence of biometric machine. To the respondents biometric techniques are more suitable to use for attendance and entry. This implies that biometric machine offers immense potential for increased quality of data stored and minimizing cumbersome system. Majority of the respondents are in a position to recommend biometric attendance maintenance technology in other organization too. In this regard mixed responses were received from the respondents, although more than one third of the respondents opined in favour of recommending biometric technology in other organizations too. Majority of the respondents opined that government legislation push administrators towards using biometric technology in their institution. Overall perception of the respondents towards biometric attendance maintenance system differs. Some of the respondents asserted that implementation of biometric attendance in every public organization is very useful and improves the working environment as it is an advanced technology, which improves the quality of work and flexibility.

Keywords: *Biometric, Finger Print, Verification, Identification, Template and Hand Geometry.*

Introduction:

Biometric attendance systems have gained significant attention in higher educational institutions due to their potential to streamline attendance management processes and minimize fraudulent attendance practices. These systems utilize unique physiological or behavioural characteristics such as finger prints, facial recognition, or iris scans to accurately record and verify student attendance. While the adoption of biometric

attendance systems offers several advantages, the acceptance and cooperation of the faculty members play a critical role in their successful implementation and effectiveness.

Biometric technology as a means of identifying and verifying an individual`s characteristic is widely used in many aspects of peoples` lives now a days. In this regard, public organizations use this technology to provide a more comprehensive system in monitoring employee attendance and also to ensure organisation's quality of service and productivity[1]. The implementation of a biometric attendance maintenance system is one method to address the management of employees to confirm attendance and ensure the effective delivery of services[2]. With rise of globalization, it is becoming essential to find the easier and more effective system to help an organization to improve their employee productivity and efficiency. Employee attendance management system is an easy way to keep track on attendance of staff within organization[3].

Aims and Objectives of the Study:

The present study aims to investigate the attitudes of the faculty members of higher educational institutions towards the biometric attendance maintenance system. Specifically, the objectives of the study are --

1. To explore the attitudes of the faculty members of higher education institutions towards biometric attendance maintenance system.

2. To identify the factors influencing acceptance or resistance of biometric attendance maintenance system among the faculty members.

Methodology of the Study:

In the present study quantitative research design is employed. This approach is used to determine and analyse the data to obtain various decisions by the researcher through the use of the questionnaire. It aims to relate the perception of the respondents and generate relevant data on the attitudes of the faculties of higher education institutions in Tripura towards biometric attendance maintenance system in the selected higher education institutions in Agartala. A mixed-methods research design has been employed. The study is based on descriptive survey method and empirical method to gather comprehensive data and capture the multiple dimensions of faculty attitudes towards biometric attendance systems. The study was conducted in some randomly selected higher education institutions in Agartala, Tripura. This design combines quantitative surveys and qualitative interviews, allowing for a more holistic understanding of the research topic. To get the concrete results the researcher performed a quantitative analysis of questionnaire. Accordingly, the present researcher used statistics for analysing perception and pattern of attitudes of the respondents. The findings were presented and discussed in a coherent manner, highlighting the key themes and insights derived from both quantitative and qualitative data.

Analyzing Empirical Data

One main objective of the study was to ascertain the attitudes of the faculties of higher education institutions towards biometric attendance maintenance system. The respondents were asked which types of biometric attendance maintenance system are operational in their institution. About100 percent (117 nos.)of the respondents stated that finger print authentication biometric attendance maintenance system is functional in their institution.

Preferences of the respondents were elicited regarding the types of biometric attendance maintenance system. It is revealed that about 14 percent of the respondents preferred facial recognition technique, whereas 72 percent of the respondents preferred finger print authentication technique. About 8 percent of the respondents preferred iris recognition technique, about 5percent respondents preferred hand geometry and

remaining 1 percent respondents preferred other types of biometric attendance maintenance system (Table 1.1). It is concluded that finger print authentication technique is the most preferable biometric attendance maintenance system to the respondents (Figure 1.1).

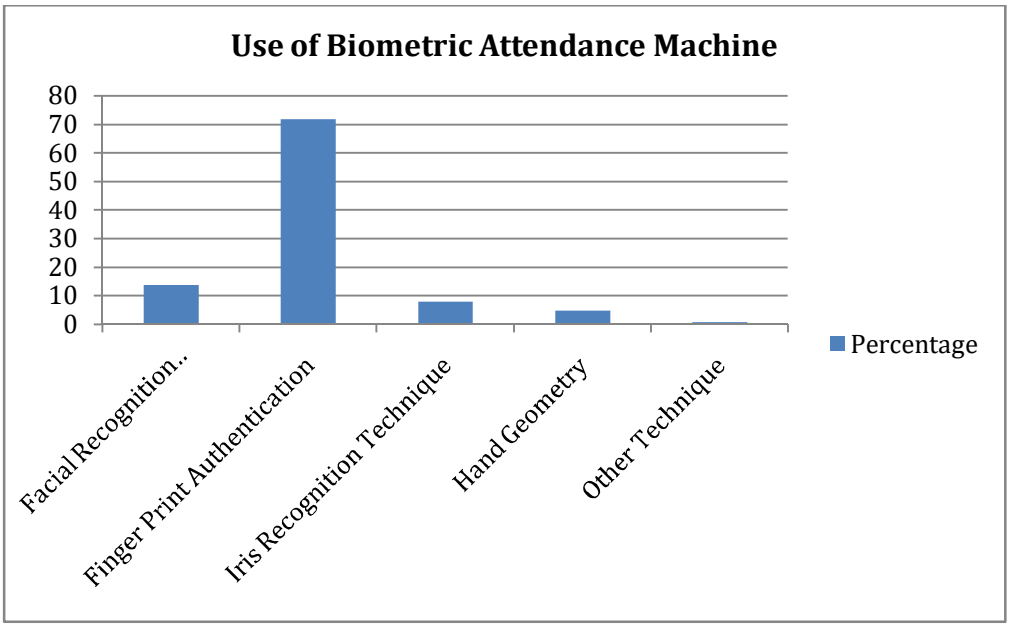
Table 1.1

Use of Biometric Attendance Machine

Responses	Number	Percentage
01	02	03
Facial Recognition Technique	16	14
Finger Print Authentication Technique	84	72
Iris Recognition Technique	9	8
Hand Geometry	7	5
Other Technique	1	1
Total	**117**	**100**

Source: Survey Questionnaire

Figure 1.1



Source: Table 1.1

Opinion of the respondents was elicited whether the respondents do agree that replacing passwords and ID cards with biometric technique is a good change. About 52 percent of the respondents replied that they strongly agree with the statement and about 35 percent respondents replied that they agree with the statement. Altogether 87 percent of the respondents replied positively that it would be a good change to replace passwords and ID Cards with biometric technology. Only 4 percent of therespondents replied

negatively, where as 9 percent of the respondents replied neutral opinion (Table 1.2). This indicates that majority of the people are well aware of the biometric attendance maintenance system and they are not satisfied with the passwords and ID Cards (Figure 1.2). Thus, the majority of the respondents have no objection and they are in favour of biometric technology implementation.

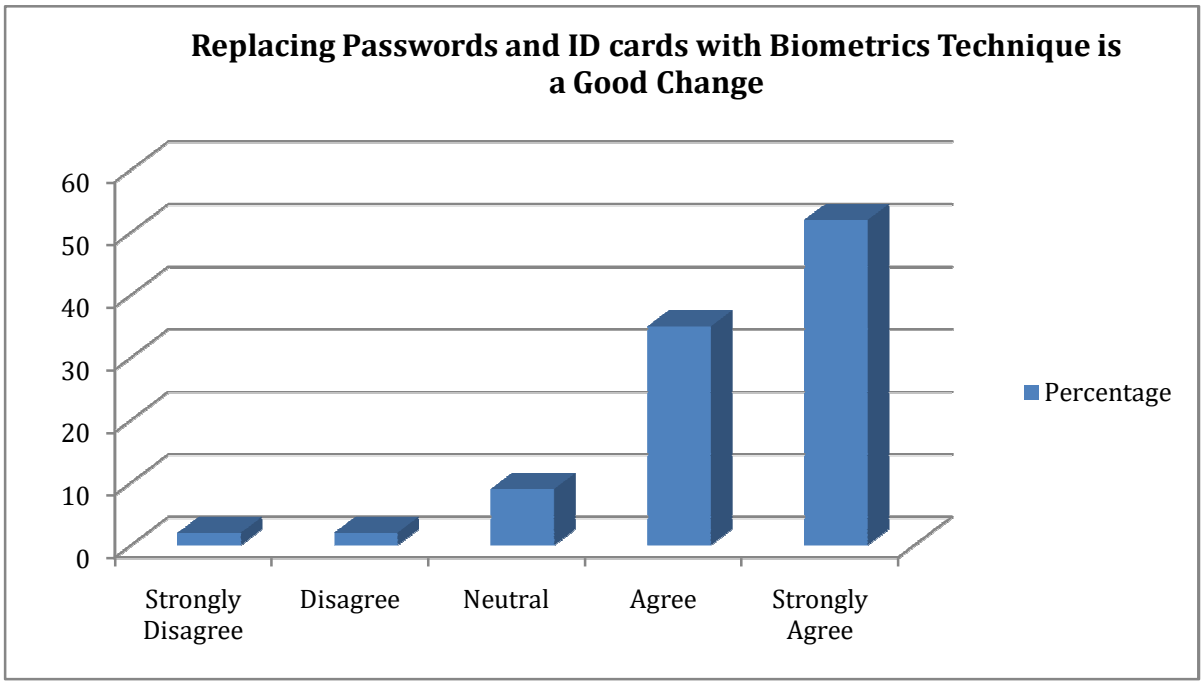
Table 1.2

Replacing Passwords and ID Cards with Biometric Technique is A Good Change

Responses	Number	Percentage
01	**02**	**03**
Strongly Disagree	2	2
Disagree	2	2
Neutral	11	9
Agree	41	35
Strongly Agree	61	52
Total	**117**	**100**

Source: Survey Questionnaire

Figure 1.2



Source: Table 1.2

Opinion of the respondents was elicited whether biometric technology is more secure than traditional attendance maintenance system. The majority (75 percent) of the respondents agreed that biometric

attendance system is more secured than traditional or manual attendance system. Only about 13 percent of the respondents opined neutrally whereas only 12 replied negatively (Table 1.3). The opinion of the respondents indicates that majority of the people are already well aware about the biometric technologies in comparison to the traditional IT security methods (Figure 1.3).

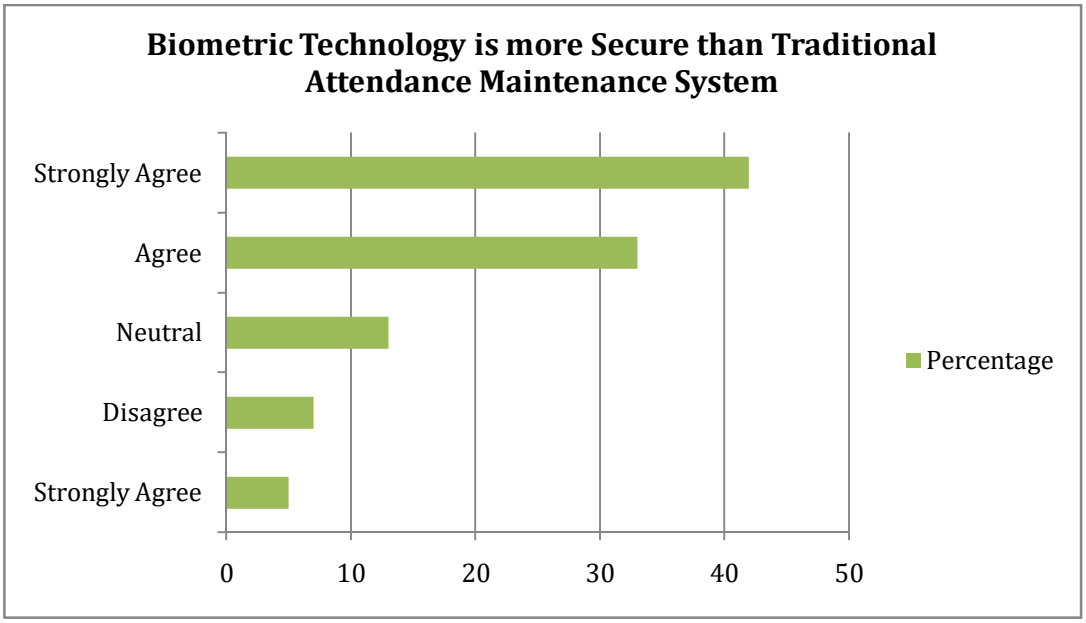
Table 1.3

Biometric Technology is more Secure than Traditional Attendance Maintenance System

Responses	Number	Percentage
01	**02**	**03**
Strongly Disagree	6	5
Disagree	8	7
Neutral	15	13
Agree	39	33
Strongly Agree	49	42
Total	**117**	**100**

Source: Survey Questionnaire

Figure 1.3



Source: Table 1.3

Table 1.4 presents the opinion of the respondents whether biometric attendance maintenance system is important to control workers. About 28 percent of the respondents strongly agreed with the statement and about 32 percent of the respondents agreed with the statement. So, in total 60 percent of the respondents

replied positively. About 27 percent of the respondents replied neutrally. Only 2 percent of the respondents strongly disagreed, whereas only about 11 percent of the respondents disagreed with the statement. So, in total about 13 percent of the respondents replied negatively i.e. they do not comply with the statement that biometric attendance maintenance system is important to control workers (Figure 1.4). This implies that there are some of changes controlling and looking over employees after biometric attendance system is being implemented.

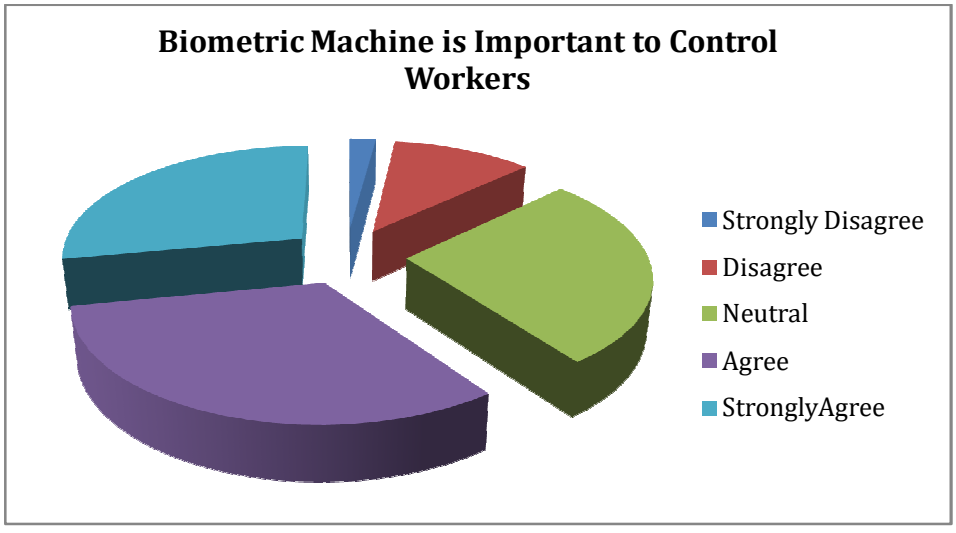
Table 1.4

Biometric Attendance Maintenance System is Important to Control Workers

Responses	Number	Percentage
01	**02**	**03**
Strongly Disagree	2	2
Disagree	13	11
Neutral	32	27
Agree	37	32
Strongly Agree	33	28
Total	**117**	**100**

Source: Survey Questionnaire

Figure 1.4



Source: Table 1.4

With regard to employees feeling in using biometric machine, about 33 percent of the respondents strongly agreed and about 48 percent of the respondents agreed upon the statement that employees are feeling comfortable in using biometric machine, whereas only about 11 percent of the respondents replied negatively (Table 1.5). This indicates that major section of the respondents believed that employees are feeling

comfortable in using biometric machine for attendance purpose (Figure 1.5). Using or even touching the biometric machine for attendance does not discourage or discomfort the workers. But still there are also respondents who are not feeling happy in the presence of biometric machine.

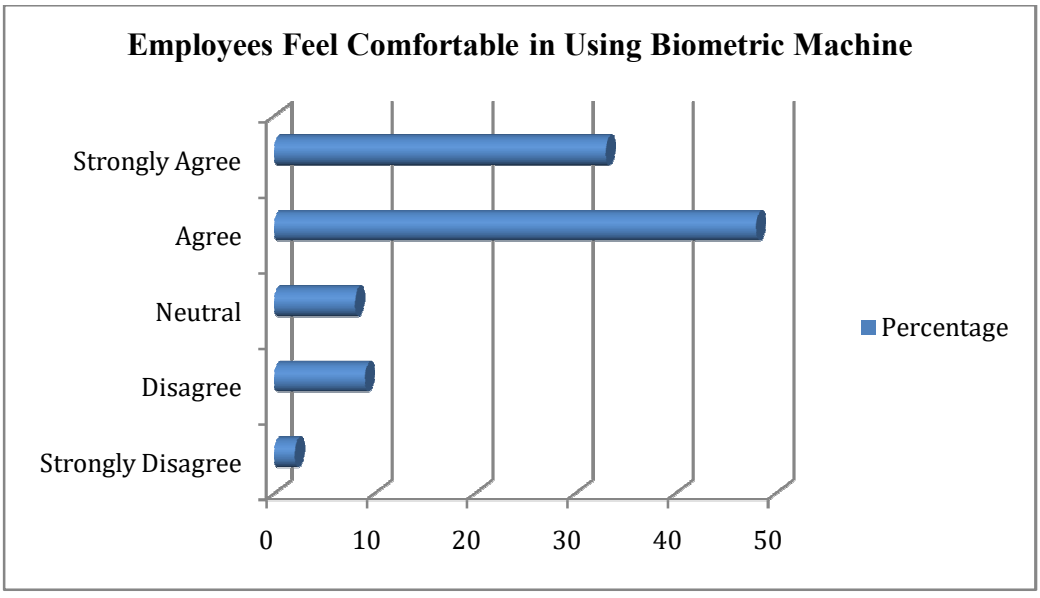
Table 1.5

Employees are Comfortable in Using Biometric Machine

Responses	Number	Percentage
01	**02**	**03**
Strongly Disagree	2	2
Disagree	11	9
Neutral	9	8
Agree	56	48
Strongly Agree	39	33
Total	**117**	**100**

Source: Survey Questionnaire

Figure 1.5



Source: Table 1.5

Perceptions of the respondents were sought whether they are agreed with the statement that biometric techniques are more suitable to use for attendance and entry. About 70 percent of the respondents agreed and strongly agreed that biometric machine or system is very suitable to use for attendance and entry, whereas only about 17 percent of the respondents replied negatively (Table 1.6, Figure 1.6)). This implies that

biometric machine offers immense potential for increased quality of data stored and minimizing cumbersome system.

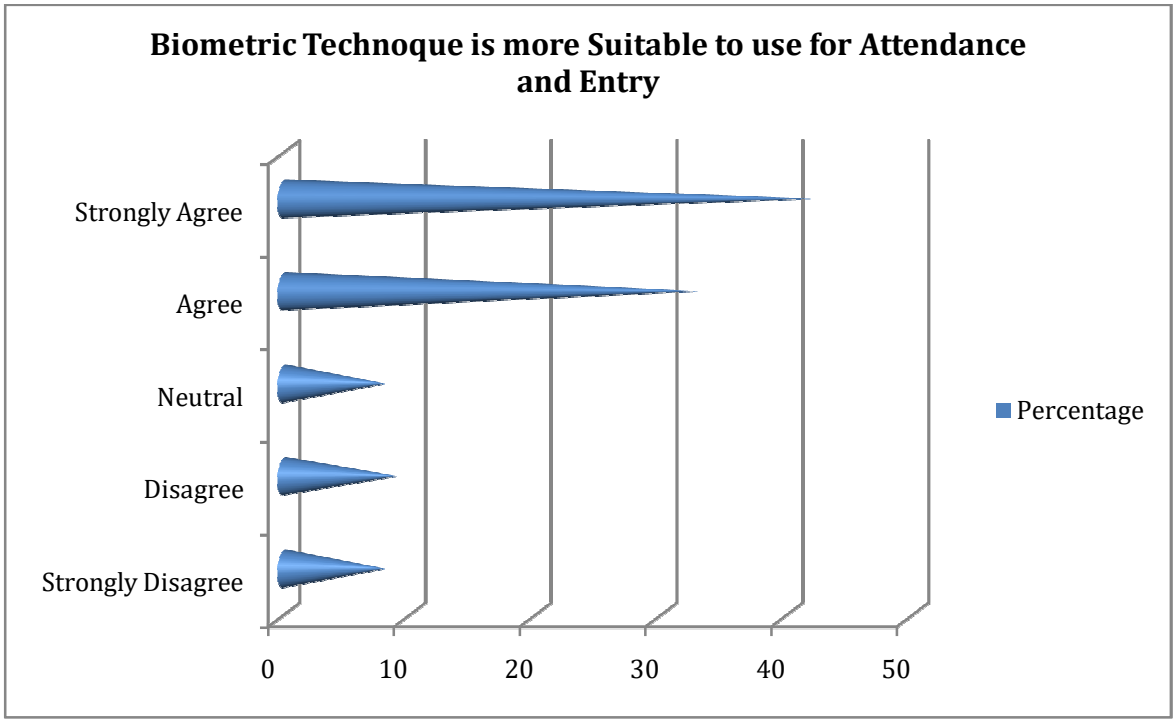
Table 1.6

Biometric Techniques is More Suitable to Use for Attendance and Entry

Responses	Number	Percentage
01	**02**	**03**
Strongly Disagree	9	8
Disagree	11	9
Neutral	9	8
Agree	39	33
Strongly Agree	49	42
Total	**117**	**100**

Source: Survey Questionnaire

Figure 1.6



Source: Table 1.6

Opinion of the respondents was sought whether they feel comfortable to recommend biometric attendance maintence technology in other organization too. About 43 percent of the respondents agreed that they would feel comfortable recommending technologies in other organization too, whereas about 32 percent of the

respondents replied negatively (Table 1.7). Only about 25 percent of the respondents were reluctant to reply either positively or negatively.

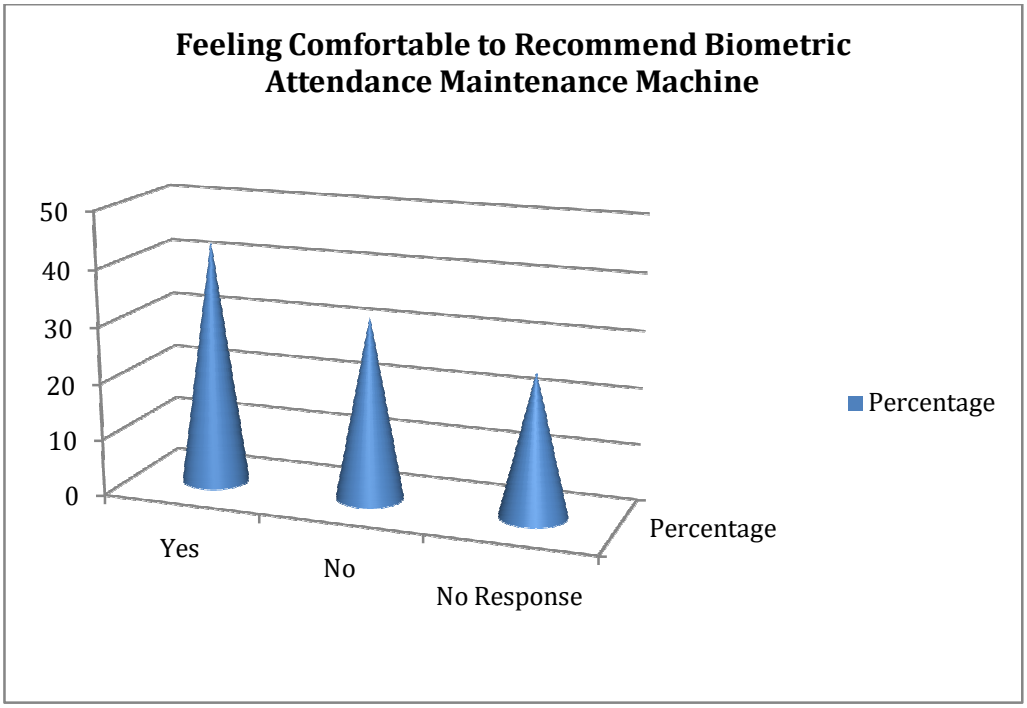
Table 1.7

Recommending Biometric System in Other Organization

Responses	Number	Percentage
01	**02**	**03**
Yes	50	43
No	37	32
No Response	30	25
Total	**117**	**100**

Source: Survey Questionnaire

Figure 1.7



Source: Table 1.7

The respondents were asked whether they were agreed upon the statement that government legislation push administrators towards using biometric technology. About 51 percent of the respondents strongly agreed and about 33 percent of the respondents agreed upon the statement that government legislation push administrators towards using biometric technology, whereas only 5 percent of the respondents replied negatively (Table 1.8, Figure 1.8). About 11 percent of the respondents answered neutrally. That indicates that government legislation push administrators towards using biometric technology in their institution.

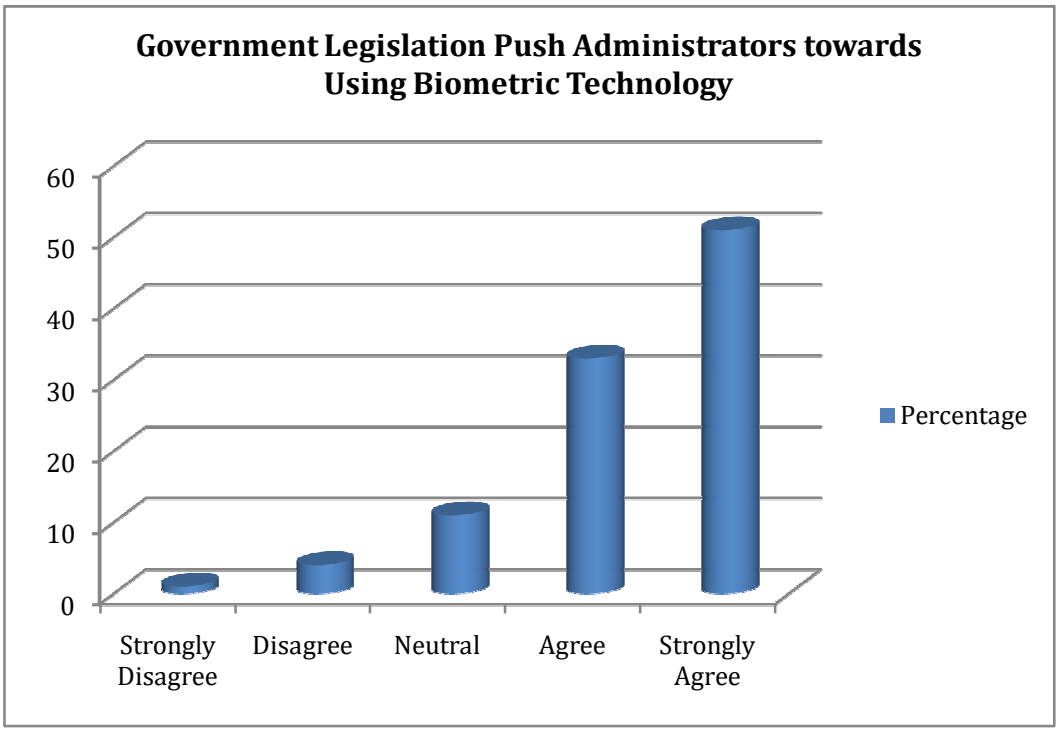
Table 1.8

Government Legislation Push Administrators towards Using Biometric Technology

Responses	Number	Percentage
01	**02**	**03**
Strongly Disagree	1	1
Disagree	5	4
Neutral	13	11
Agree	39	33
Strongly Agree	59	51
Total	**117**	**100**

Source: Survey Questionnaire

Figure 1.8



Source: Table 1.8

To elicit the attitude of the respondents on their overall perception towards biometric attendance maintenance system an open ended question was asked. The respondents replied differently. Some of the respondents asserted that implementation of biometric attendance maintenance system in every public organization is very useful and improves the working environment as it is an advanced technology, which improves the quality of work and flexibility.

Factors Responsible for Acceptance or Resistance of Biometric:

Attendance Maintenance System:

Several factors are responsible for acceptance or resistance of bio-metric attendance maintenance system. So, it is very important to explore user's opinion towards the factors responsible for acceptance or rejection of biometric attendance maintenance system. To explore the opinion of the respondents the present researcher put forward a question to the respondents if they were agreed with the statement that authenticity factor is responsible for acceptance or resistance of bio-metric attendance maintenance system. About 42 percent of the respondents strongly agreed and about 32 percent of the respondents agreed upon the statement. So, in total about 74 percent of the respondents replied positively (Table 1.9). Only about 16 percent of the respondents replied negatively that they don't comply with the statement. About 10 percent replied neutrally with the statement. So, it is concluded that authenticity factor is mostly responsible for acceptance or rejection of biometric attendance maintenance system which has been supported by the majority of respondents (Figure 1.9).

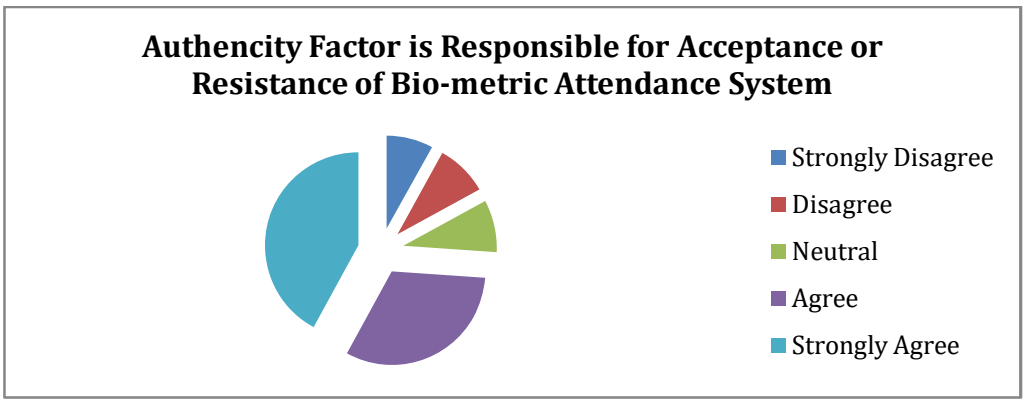
Table 1.9

Authenticity Factor is Responsible for Acceptance or Resistance of Biometrics

Responses	Number	Percentage
01	**02**	**03**
Strongly Disagree	9	8
Disagree	11	9
Neutral	11	9
Agree	37	32
Strongly Agree	49	42
Total	**117**	**100**

Source: Survey Questionnaire

Figure 1.9



Source: Table 1.9

Reliability is an important factor in implementing biometric attendance maintenance system. To elicit the opinion of the respondents the present researcher asked the respondents whether they were agreed upon the statement that reliability factor is responsible for acceptance or resistance of bio-metric attendance system. Table 1.10 indicates that 65 percent(42+23) of the respondents agreed that biometric attendance system is reliable. But, about 25 percent (12+13) of the respondents disagreed and about 10 percent respondents have neutral response on the reliability of biometric attendance respectively (Figure 1.10). This implies that biometric attendance system has reliability in using for attendance purpose for the employees in the organization.It is important to use biometric machine than the manual or old system in order to keep the confidentiality of the workers and always keep safe data.

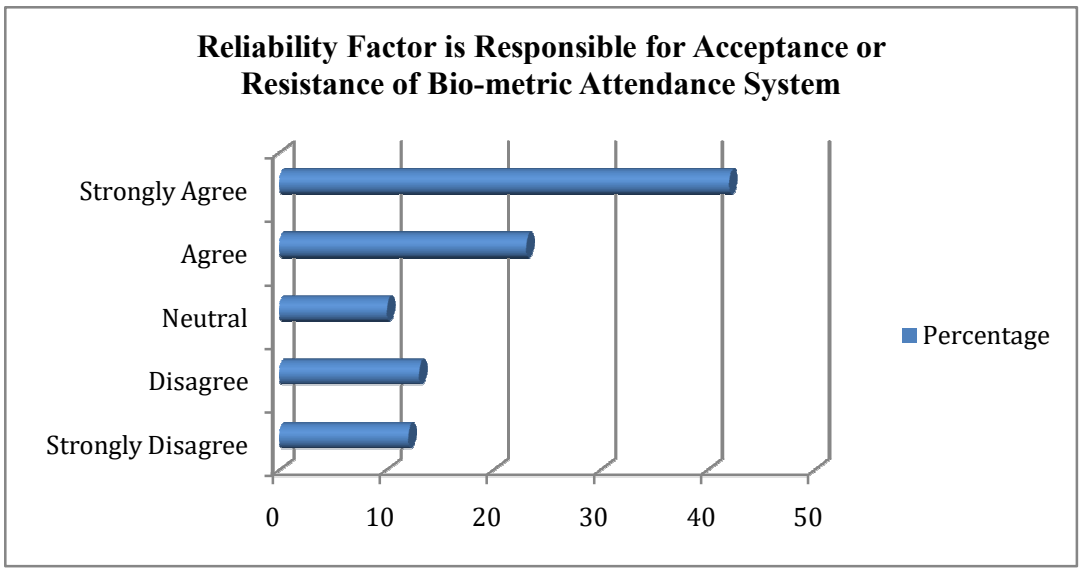
Table 1.10

Reliability Factor Is Responsible for Acceptance or Resistance of Biometrics

Responses	Number	Percentage
01	**02**	**03**
Strongly Disagree	14	12
Disagree	15	13
Neutral	12	10
Agree	27	23
Strongly Agree	49	42
Total	**117**	**100**

Source: Survey Questionnaire

Figure 1.10



Source: Table 1.10

Security concern is another important factor in implementing biometric attendance maintenance system. About 56 percent of the respondents replied that biometric attendance maintenance system is a secure system. About 32 percent of the respondents replied that they do not comply with the statement. Only about 12 percent of the respondents replied neutrally (Table 1.11). So, it can be said that majority of the respondents considered security issue as an important factor of implementing biometric attendance maintenance system (Figure 1.11).

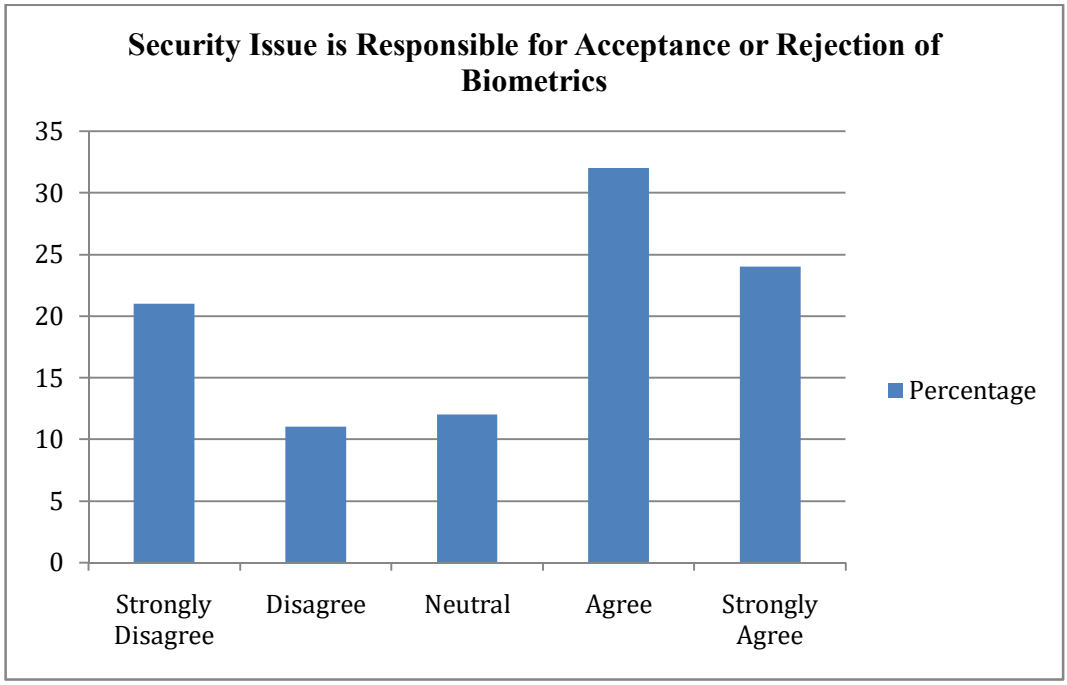
Table 1.11

Security Issue is Responsible for Acceptance or Resistance of Biometrics

Responses	Number	Percentage
01	**02**	**03**
Strongly Disagree	25	21
Disagree	13	11
Neutral	14	12
Agree	37	32
Strongly Agree	28	24
Total	**117**	**100**

Source: Survey Questionnaire

Figure 1.11



Source: Table 1.11

Transparency is also an important factor in implementing biometric attendance maintenance system. To elicit the opinion of the respondents they were asked whether they comply with the statement that transparency factor is responsible for acceptance or resistance of bio-metric attendance system. Table 1.12 shows that about 72 percent of the respondents considered biometric attendance maintenance system as a transparent system. About 12 percent of the respondents replied negatively, whereas 16 percent of the respondents replied neutrally (Figure 1.12). So, it is concluded that transparency one of the important factor for acceptance of resistance of biometrics.

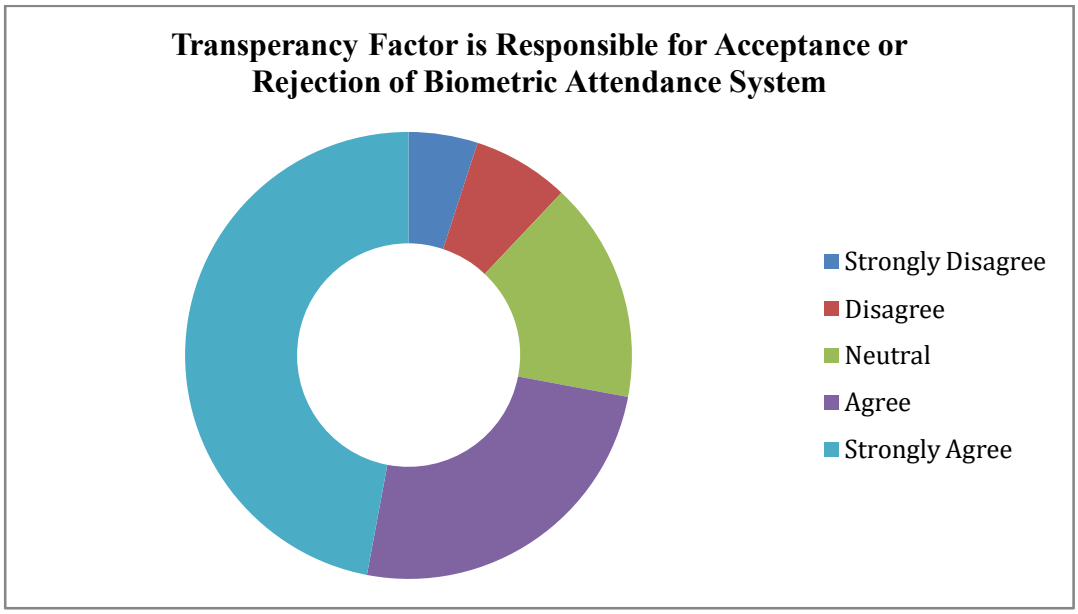
Table 1.12

Transparency Factor is Responsible for Acceptance or Resistance of Biometrics

Responses	Number	Percentage
01	**02**	**03**
Strongly Disagree	6	5
Disagree	8	7
Neutral	19	16
Agree	29	25
Strongly Agree	55	47
Total	**117**	**100**

Source: Survey Questionnaire

Figure 1.12



Source: Table 1.12

Privacy issue is also important in attendance maintenance system and its absence adversely affects positive benefits of the system. About 42 percent of the respondents agreed upon the privacy concern of biometric attendance maintenance system. About 34 percent of the respondents replied negatively (Table 1.13, Figure 1.13). About 26 percent of the respondents expressed neutral opinion. This implies that there are no strict rules and regulations to control the system and there is a chance to expose individual data to others or exposure of password.

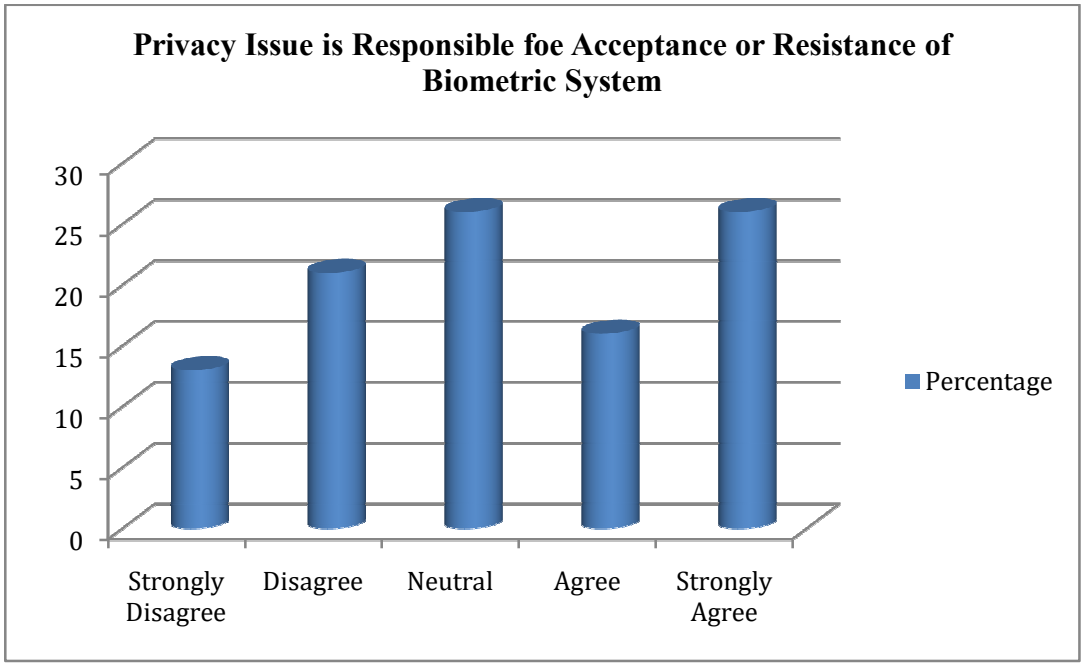
Table 1.13

Privacy Issue is Responsible for Acceptance or Resistance of Biometrics

Responses	Number	Percentage
01	**02**	**03**
Strongly Disagree	15	13
Disagree	24	21
Neutral	30	26
Agree	18	16
Strongly Agree	30	26
Total	**117**	**100**

Source: Survey Questionnaire

Figure 1.13



Source: Table 1.13

Preferences of the respondents were elicited which one is the most influencing factor among various influencing factors of biometric attendance maintenance system. About 32 percent of the respondents preferred authenticity factor, 22 percent of the respondents preferred transparency factor, 26 percent of the respondents preferred reliability factor, 12 percent of the respondents preferred security issue and remaining 8 percent preferred other issues (Table 1.14). This indicates that authenticity factor is considered as the most influencing factor among the various influencing factors of biometric attendance maintenance system (Figure 1.14).From the study result it is concluded thatauthenticity factor, reliability issue, security issue works as the major determining factor in acceptance or rejection of biometric attendance maintenance system.

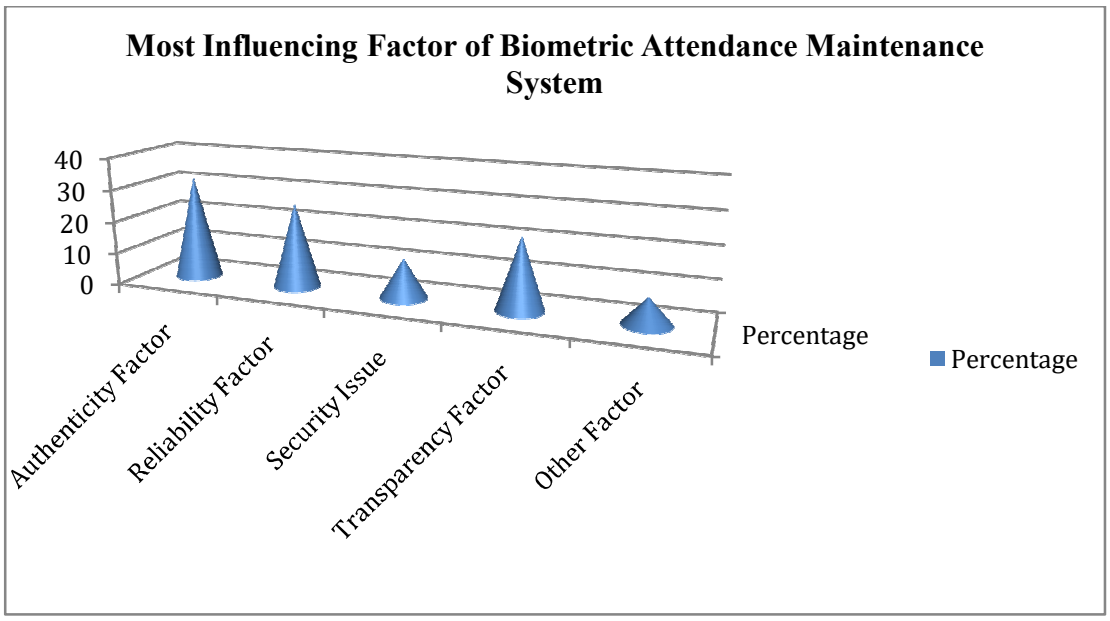
Table 1.14

Most Influencing Factor of Biometric Attendance Maintenance System

Responses	Number	Percentage
01	**02**	**03**
Authenticity Factor	38	32
Reliability Factor	30	26
Security Issue	14	12
Transparency Factor	27	22
Other Factor	8	8
Total	**117**	**100**

Source: Survey Questionnaire

Figure 4.14



Source: Table 4.14

Discussion:

Perception of the Respondents towards Biometric Attendance System:

The result of the study shows that finger print authentication biometric attendance maintenance system is functional in all the higher education institutions in Tripura. It is the most preferable biometric attendance maintenance system to the respondents. The majority of the people are well aware of the biometric attendance maintenance system and they are not satisfied with the passwords and ID Cards. Thus, the majority of the respondents have no objection and they are in favour of biometric technology implementation.

Biometric attendance technique is more secured than traditional or manual attendance system. Majority of the people are already well aware about the biometric technologies in comparison to the traditional IT security methods. To the respondents biometric attendance maintenance system is important to control workers. This implies that there are some of changes controlling and looking over employees after biometric attendance system is being implemented. It is revealed that employees are feeling comfortable in using biometric machine for attendance purpose. Using or even touching the biometric machine for attendance does not discourage or discomfort the workers. But, still there are some respondents who are not feeling happy in the presence of biometric machine. To the respondents biometric techniques are more suitable to use for attendance and entry. This implies that biometric machine offers immense potential for increased quality of data stored and minimizing cumbersome system.

Majority of the respondents are in a position to recommend biometric attendance maintenance technology in other organization too. In this regard mixed responses were received from the respondents, although more than one third of the respondents opined in favour of recommending biometric technology in other organizations too. Majority of the respondents opined that government legislation push administrators towards using biometric technology in their institution. Overall perception of the respondents towards biometric attendance maintenance system differs. Some of the respondents asserted that implementation of biometric attendance in every public organization is very useful and improves the working environment as it is an advanced technology, which improves the quality of work and flexibility.

Factors Responsible for Acceptance or Resistance of Biometric:

Attendance Maintenance System:

Several factors are responsible for acceptance or resistance of bio-metric attendance maintenance system. It was observed that authenticity factor is mostly responsible for acceptance or rejection of biometric attendance maintenance system. Reliability is another important factor. It is important to use biometric machine than the manual or old system in order to keep the confidentiality of the workers and always keep safe data.

Security concern is another important factor in implementing biometric attendance maintenance system. Majority of the respondents considered security issue as an important factor of implementing biometric attendance maintenance system. Transparency is also an important in this regard. The largest section of the respondents replied that biometric attendance maintenance system is transparent system.

Privacy issue is also important in attendance maintenance system and its absence adversely affects positive benefits of the system. Privacy concern of biometric attendance maintenance system was supported by the major percentage of the respondents. This implies that there are no strict rules and regulations to control the system and there is a chance to expose individual data to others or exposure of password. With regard to

preferences of the respondents as influencing factors of biometric attendance maintenance, they preferred authenticity factor as the most. From this study results, authenticity factor, reliability issue, security issue works as determining factor in acceptance or rejection of biometric attendance maintenance system.

Conclusion:

The results of the study indicate the attitude patterns of the faculties of higher education institutions in Tripura towards biometric attendance maintenance systems. To the users biometric systemis quite good; they have faith in biometric systems. It is concluded that majority of the people are well aware about the advantages of biometrics and they trust the system.But, they still favour a more secure technology to avoid information theft and abuse. In addition, it is observed that majority of the people do not have any knowledge regarding the cost advantage of biometric technology with respect to its outcomes and there is a need to spread awareness about the cost advantages (implementation and maintenance) of biometric technology implementation to increase the user acceptance. It is perceived that if long-term aim is to successfully implement in educational institutions biometrics technology in higher education institutions in Tripura as elsewhere is utmost essential. It is observed that there are still many areas that need to be explored i.e. the limitations and restrictions in different environments where the biometric devices are expected to be implemented.

After analysis, the survey questionnaires, the present researcher has identified that respondents related to higher education institutions are mainly positive toward the implementation of biometrics in their organization and they have more or less knowledge about the biometrics implementation with respect to its attributes. It is observed that for cost benefit advantage in the initial implementation stages the finger print technology could be a better selection as compared to other available biometric technologies. For successful implementation of biometric technology, the biometric system must be error free so that it will increase the acceptance rate.

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