

## **Acceptance of Banking on Biometric in Iran's Banking System Case Study of Saman Bank**

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### **ABSTRACT**

Today, banks are searching for the ways to provide fast, convenient and secured banking transactions. Security is one of the significant factors impacting the customers' trust to the banks. Using a perfect authentication method could help banks offer more secured services to their customers. Biometric authentication is one of the methods that could provide a high degree of security and is used in several banks in the world. One issue that is important in implementation of a biometric authentication system in a bank is the acceptance of banking on biometric by customers and also employees. In this paper, employees' and customers' conceptualizations about the introduction and accomplishment of a biometric authentication system in Saman bank of Shiraz-Iran is investigated. The results indicated that although the participants are aware of biometric technology's benefits, they believe that cultural and economic problems could be the two obstacles for implementation of such an authentication system in the banks of Iran.

**KEYWORDS::** Biometric, Banking, Authentication, Customer acceptance, Security

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### **INTRODUCTION**

One important issue for the progress of an organization is "trust". It is even more important for financial institutes and banks, because they have significant roles in economic development of countries. Providing fast, convenient, and secured services for customers is the way to achieve the customers' reliance. Banks should assure that there is no security breach in banking transactions and customers can easily benefit from the banks' services, without being worried about the security issues. The authentication method selected by the bank for identifying customers should be reliable and user-friendly. Methods for authentication can be organized into three basic categories: something the user knows (like a word, passphrase, and a personal identification number (PIN)), something the user possesses (like identification card, passport, swipe card, proximity card, USB tokens, and keys), and something the user is (biometric) [3]. A biometric system measures one or more physical or behavioral characteristics, to determine or verify his identity. Biometrics traits are inherent to an individual. It is difficult to manipulate, share, or forget a biometric property [1]. Well-known biometric techniques of authentication are fingerprints or finger veins, voice, iris or retinal scan, hand scan or hand veins, keystroke, and hand geometry. Biometric technology has many applications in different areas. It can be used for providing security (physical and logical access), law enforcement and forensic applications, financial sector, travel and healthcare applications[7]. Biometric technology can help banks and financial institutions provide a high level of security. Some major tasks in a banking system are branch banking, ATM banking, internet banking, telephone banking and POS banking. Deploying biometric technology in these operations can secure banking transactions. Along with the benefits that biometric technology provides for the banks, there are some issues that need to be under consideration when deciding to implement a biometric authenticating system in such an organization. Employees' training, customers' awareness, economical problems and cultural concerns are some of the important issues that should be considered. To implement a biometric system, at first the bank should evaluate the cost of the system, and consider the cultural issues. It also needs knowledgeable employees who are familiar with such a system, and customers should be learned and be informed of that biometric system.

In the following sections first the advantages of biometric authentication are counted, after that we reviewed banking on biometric in the world's bank. The employees' and customers' perceptions about introduction and deploying biometric authentication in banking operations of Saman Bank of Iran-Shiraz is discussed in the next section. The results analyzed and presented in the last section.

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**1. Need for Biometrics in the banks**

Banks are one of the factors that have important effects on economic power of a country. With the help of their credential and financial policies, banks can support economic growth or vice versa they can stop and provide economic downturn in a country. According to the special status of banks and financial institutions, the security issue has the highest priority in this industry. Since the critical assets of an organization are its information, it is necessary to find a way for protecting the assets from unauthorized access of a third person. By increasing identity theft, legislators are motivating banks to improve their authentication systems, but most of the banks are using inadequate applications that cannot prevent the fraud enough [6]. Also we know that accurate identification of a person could deter crime and fraud [1], so the need for a stronger authentication of customers is obvious.

**2.1 Biometric Advantages**

Passwords and tokens are two traditional authentication methods that are not secured enough, as we see in [4], six attacks can be launched against authentication systems based on passwords and tokens. These attacks are Client attack, Host attack, Eavesdropping, theft and copying, Reply attack, Trojan horse and Denial of service. In contrary with these methods, biometric is difficult to copy, share and distribute, as much ease as passwords and tokens. Also, biometrics traits cannot get lost or be forgotten, it is difficult to forge them and it is so hard for a user to repudiate. In addition, the users of the system have relatively equal security level and one account is no easier to break than any other. Biometrics introduces incredible convenience for the users, because the users are no longer required to remember multiple, long, complex and frequently changing passwords.[5]

**1.2 Biometric authentication in the world’s banks**

One of the industries that can significantly benefit from biometric technology is banking sector. Since banks and financial institutions need more secured transactions, more than other parts of society, biometric authentication can be the best solution for providing a high degree of security.

According to [2], among the world’s banks that use biometric technology, 52% of them located in Asia and 32% in America. Among these banks, fingerprint with approximately 48% is the most favored biometric technique that used in different banking operations. The next biometric techniques that used mostly by the banks are finger vein pattern and voice biometric with about 12%. Other biometric techniques with less than 10% are respectively hand vein, iris, signature, hand geometry, face, keystroke and hand scan. In table 1, we can see the percentage of usage of each biometric mode in the world’s banks, which deploy this authentication method in their operations.

Table 1- Proportion of used biometric technologies in the world’s banks [2]

	Fingerprint	Finger vein	Voice	Hand vein	Iris	Signature	Hand geometry	Face	Keystroke	Hand Scan
%	47.93	12.39	11.57	9.09	7.43	5.76	4.95	3.30	1.65	0.83

About 45% of these banks in the world deploy biometric technologies in ATM banking, and approximately 24% of them benefit from this authentication method in their access control systems [2]. In table 2, we can see the percentage of using biometric technology in different banking operations in the world’s banks, which deploy this authentication method.

Table 2- Proportion of using biometrics in different operations [2]

	ATM	Access control	Branch banking	Internet banking	Telephone banking	POS
%	45.45	23.97	22.31	9.91	6.61	2.48

In Iran, banks use traditional authentication methods for authenticating users during the banking operations, for example, the customers are authenticated through the cash card and the PIN code in ATMs and POS devices.

**2. Acceptance of banking on biometric in Iran’s banking system – Saman bank**

In this section, the acceptance of banking on biometrics is analyzed. A combination of survey and interviews used to collect the required data. Interviews conducted with employees and customers and along with that, we gave them the questionnaires for investigating the perceptions of employees and customers about biometric technology. Two questionnaires prepared for both customers and employees of Saman Bank in Shiraz-Iran. The questionnaires distributed between 14 employees and 120 customers of Saman Bank of Shiraz. The results are presented in two parts of: Employees and Customers.

**Employees – Results**

Employees asked to express their opinions and answer to several questions about the introduction of biometrics and its usage in the banking sector. The results and analyses are presented as figures and tables in this section.

As we see in figure 1, over 75% of the employees believe that the security of banking transactions has high impacts on customers’ trust of the Saman Bank. The next bar shows that 57% of the employees are believed in that the security of banking operations has a high dependency to the method of authentication.

As it is shown in figure 2, all the employees indicated that biometric technologies could provide safety for banking transactions, despite the traditional methods of authentication, like passwords and tokens, which could not secure the banking transactions enough. Among the employees of Saman bank of Shiraz, just 28% of them were not familiar with the biometric technology, before we explained that to them. Furthermore, only 7.14% of them ever used this technology.

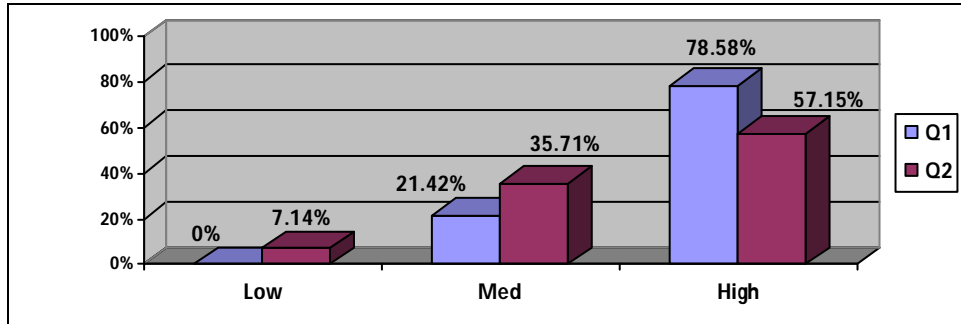


Figure 1-Employees opinions about: How much the security of banking transactions affect the customers’ trust (Q1), and how much the security depends on the method that is chosen for authentication (Q2)

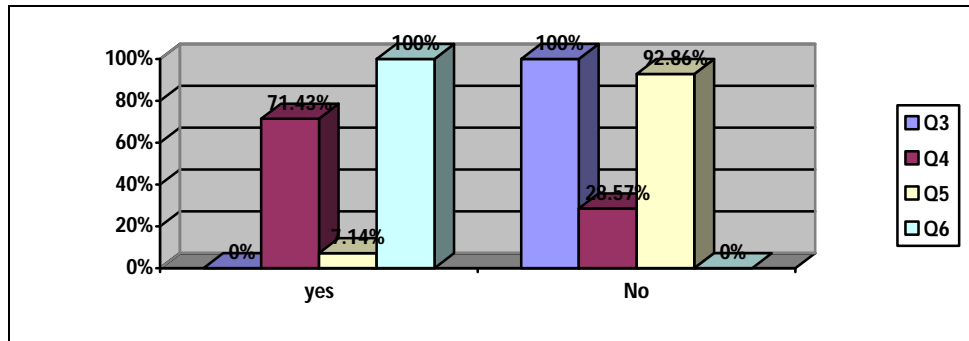


Figure 2-Employees opinions about: the security of traditional methods of authentication(Q3), earlier familiarity of them with biometric(Q4), If they ever used the biometric(Q5), and if biometric could provide enough security?(Q6)

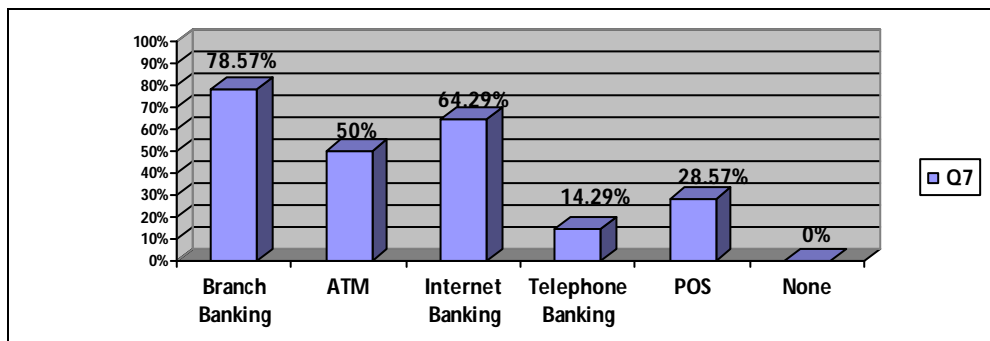


Figure 3-Employees opinions about: In which banking operations it is better to use biometric technology(Q7)

We asked the employees to express their opinions about the banking operations that in them the biometric authentication works well. They could select more than one option, or even they could select none of the operations. Almost 79% percent of them indicated that biometric works well in branch banking, 64% of the employees selected

internet banking to be used with biometric authentication, and in the third place there was ATM banking with 50%. As it is shown in figure 3, POS and telephone banking were not recommended to use biometrics.

The employees' viewpoints considered regarding biometric techniques that preferred for different banking operations. They could also select none of the biometric technique for the operations. As we see in table 3, they respectively chose biometric authentication techniques of face, fingerprint/finger vein and palm print/palm vein, to be deployed in branch banking. The most favored biometric technique for ATM machines was fingerprint/ finger vein technology, since 71% of the employees selected it. Respectively, 64% and 43% of the employees preferred face and keystroke modes to be deployed in internet banking. Half of the respondents didn't mark any biometric techniques to be used in telephone banking and others suggested voice biometric. Also, 50% of the employees felt that biometric authentication is not recommended for POS devices and in this case 43% of them selected fingerprint/ finger vein authentication technique.

Table 3- which biometric technology is recommended for each banking operations

	Fingerprint/vein	Palm print/Vein	Iris	Retinal	Voice	Face	Keystroke	None
Branch banking	64.29%	21.43%	-	-	-	71.43%	-	-
ATM	71.43%	28.57%	7.14%	-	-	-	-	14.29%
Internet banking	14.29%	-	-	-	-	64.29%	42.86%	7.14%
Telephone banking	-	-	-	-	50%	-	-	50%
POS	42.86%	7.14%	-	-	-	-	-	50%

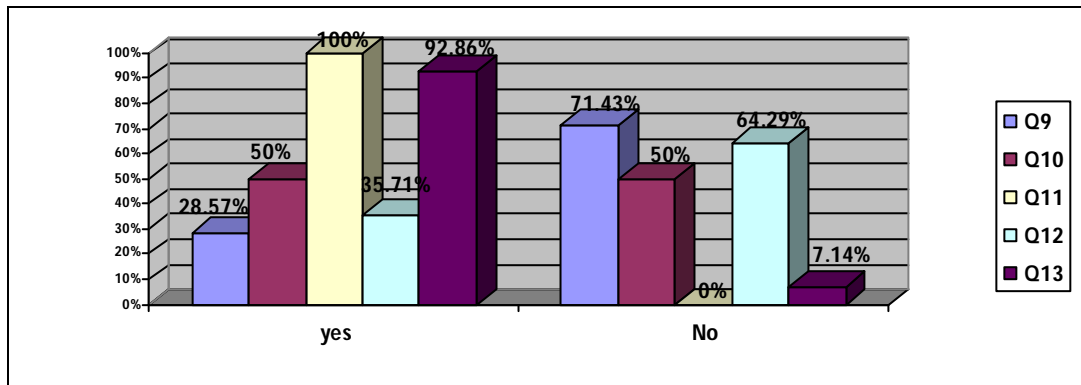


Figure 4- Employees opinions about: contradiction of banking culture in Iran and biometric technology(Q9), contradiction of customers' culture in Iran and biometric technology(Q10), the ability of biometric technology to upgrade the security of banking transactions(Q11), affordability of implementation of biometric technology economically(Q12), and the agreement of employees with the implementation of biometric systems in the bank(Q13).

Employees asked to show their viewpoint about the conflict of biometric technology with the culture of banking system and also with the culture of customers in Iran. Only 29% of them agreed that the banking culture in Iran has the contrary with implementing biometric technology in banking sector, and others disagreed on this issue. Furthermore, 50% of them agreed with the contradiction of customers' culture and biometric technology.

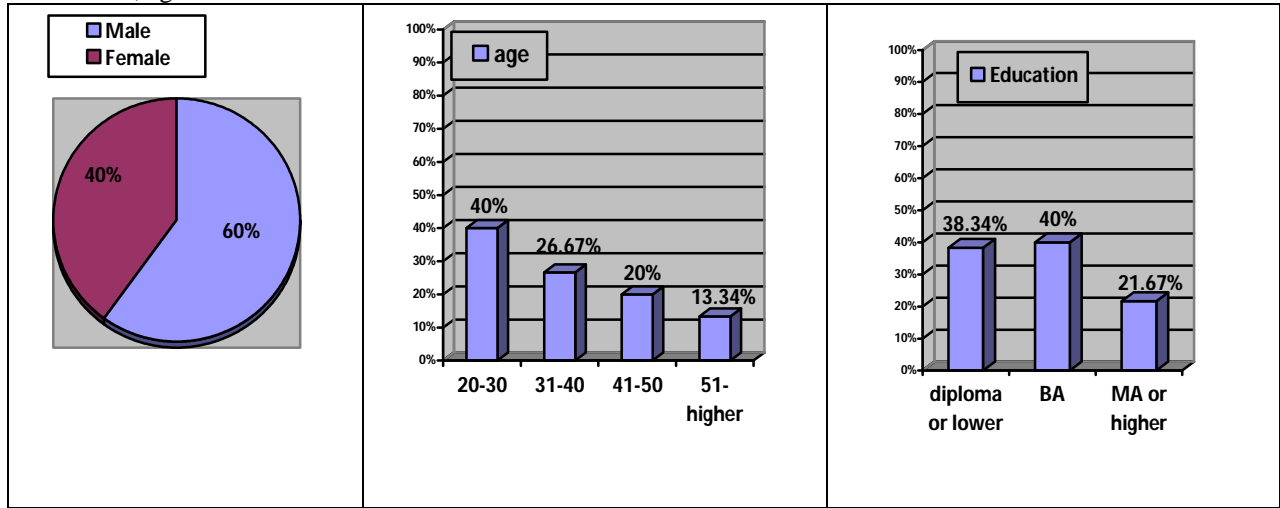
All the employees said **yes** to the ability of biometric technology to upgrade the security of banking transactions, and about the economic feasibility, almost 64% of the employees expressed that it is not economically affordable to deploy biometric in Iran banking sector. Nevertheless, 92% of the employees agreed to benefit from biometric technology in banking applications in the future.

### Customers - Results

The same as employees, customers asked to clarify their conceptions and answer to several questions about biometric technology. Some of these questions were common with the employees.

In the first part, customers asked to give some general information about their selves (As we see in table 4).

Table 4- Sex, age and Education of the customers



Customers explained their views about how much the security of banking transactions affects their trust to the bank. More than 73% of them indicated that security has a high impact on their trust to the banks. Also, as it is shown in figure 5, 25% of the customers said that it has medium effect for them.

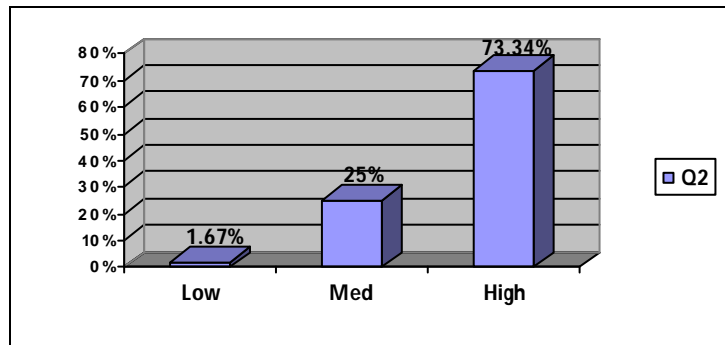


Figure 5- How much the security of banking transactions effects the customers' trust (Q2)

As it is shown in figure 6, more than 80% of the customers represented that the traditional methods of authentication, like passwords and tokens, could not provide secured banking transactions. Among the customers of Saman bank in Shiraz, just 46% of them were familiar with the biometric technology, before we introduced the biometric technology to them and only 18% of them ever used this technology. Nevertheless, 98% of the customers agreed that the biometric technology could secure the authentication process in banking operations. It is noteworthy to indicate that despite more than 81% of the customers never used the biometric technology; they agreed that this method could provide security in the banking sector.

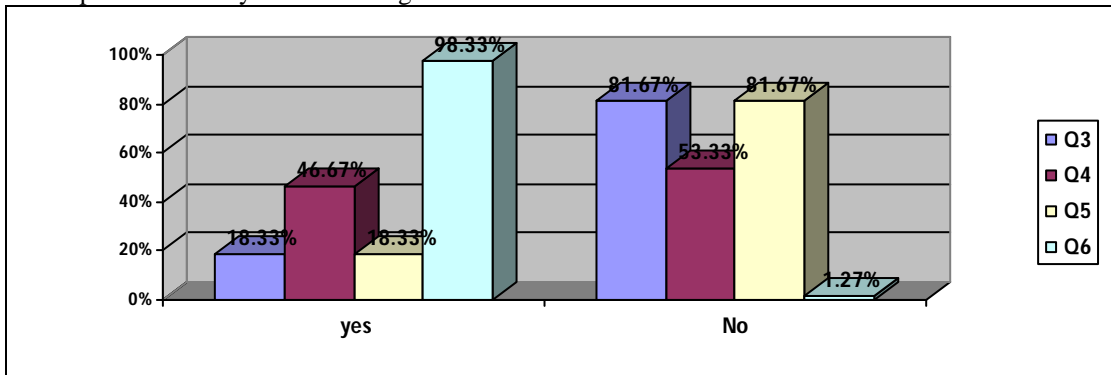


Figure 6- Customers opinions about: the security of traditional methods of authentication(Q3), earlier familiarity of them with biometric(Q4), If they ever used the biometric(Q5), and if biometric could provide enough security?(Q6)

We asked the customers to show their viewpoint about which banking operations are recommended for using biometric authentication. As it is shown in figure 7, the results were significantly similar to the employees' responses. Respectively they selected branch banking, internet banking and ATM banking.

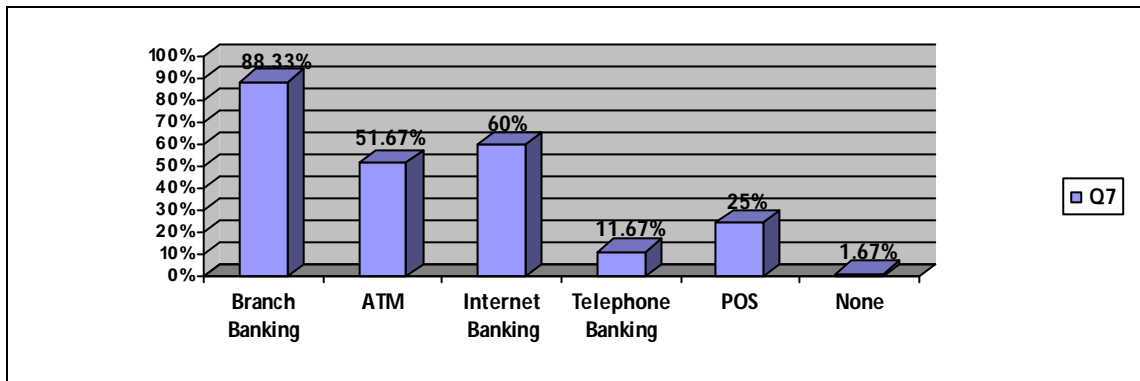


Figure 7- Customers' opinions about: In which banking operations it is better to use biometric technology(Q7)

Customers' viewpoints were considered regarding biometric techniques that preferred for different banking operations. As we see in table 5, the most favored biometric techniques for deploying in branch banking were fingerprint/ finger vein and face authentication. The same as employees' responses, customers selected fingerprint/ finger vein technology to be used in ATM machines and they selected face and keystroke (with 57% and 20% of the) for internet banking. Also, 30% of the customers thought that biometric authentication is not recommended to be used in telephone banking and other respondents preferred voice biometric. Furthermore, 28% of the employees didn't mark any biometric technologies for POS devices, although fingerprint/ finger vein modes were the most favored with almost 68% of respondents selecting it.

Table 5- which biometric technology is recommended for banking operations

	Fingerprint/vein	Palm print/Vein	Iris	Retinal	Voice	Face	Keystroke	None
<b>Branch banking</b>	75%	16.67%	-	-	-	56.67%	-	-
<b>ATM</b>	60%	10%	7.14%	-	-	-	-	16.67%
<b>Internet banking</b>	8.33%	-	-	-	-	56.67%	20%	18.33%
<b>Telephone banking</b>	-	-	-	-	70%	-	-	30%
<b>POS</b>	68.33%	3.33%	-	-	-	-	-	28.33%

Customers were been asked to express their opinions about the confliction of biometric technology with the culture of banking system and also with the culture of customers in Iran. As it is shown in figure 8, 45% of them agreed that the banking culture in Iran has contrary with implementing biometric technology in banking sector, and others disagreed with this issue. 53% of them agreed with the contradiction of customers' culture with biometric technology.

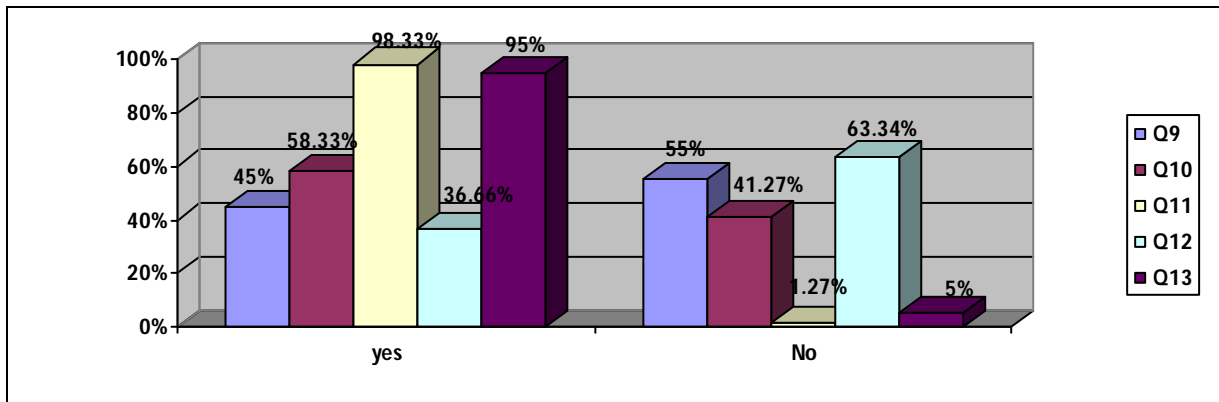


Figure 8- Customers opinions about: contradiction of banking culture in Iran and biometric technology(Q9), contradiction of banking customers' culture in Iran and biometric technology(Q10), the ability of biometric

technology to upgrade the security of banking transactions(Q11), affordability of implementation of biometric technology economically(Q12), and the agreement of customers with the implementation of biometric systems in the bank(Q13).

Most of the customers said that the biometric technology could provide a high degree of security in banking transactions and similarly to the employees' responses, almost 63% of customers expressed that implementing a biometric system in Iran's banking sector is not economically affordable. Nevertheless, 95% of the customers agreed to deploy biometric technology in banking applications in the future.

### **3. Discussion about the results**

After analyzing the responses of both employees and customers of Saman Bank in Shiraz, the following can be observed:

- More than 70% of the employees and customers confirmed that the security of banking transactions has a significant impact on the customers' trust to the bank
- Majority of employees confirmed that the security of banking transactions excessively dependent on the method of authentication
- All of the employees and more than 80% of the customers believed that the traditional methods of authentication (passwords and tokens) can not provide adequate security.

Due to these results, it can be figured out that the current methods of authentication, which are used in the banks of Iran, are not secured enough. Since the customers are the most valuable assets in an organization and due to the importance of security for banks' customers, the need for a stronger authentication method is obvious.

- All of the employees and more than 98% of the customers confirmed that biometric technology can provide a high degree of security for banking transactions.

It seems that biometric authentication is a perfect solution for solving the problems caused from the weaknesses of traditional methods and it could provide a high level of security.

- Both employees and customers believed that the most appropriate banking operations that are qualified to apply biometric technology are respectively branch banking, internet banking and ATM banking
- The most preferred biometric techniques to be used in these three banking operations are fingerprint/ finger vein and Face recognition.

Users did not have a very strong recommendation to deploy biometric technology in several banking operations, like POS and telephone banking. Nevertheless, they preferred to use voice recognition system for authentication during telephone banking. It has a better feeling for customers when they could be identified through their voice and simply do the banking transactions without memorizing PIN, username and password, but the problems involved with this method of authentication should not get forgotten (for example, changing the voice when an individual gets older or sick).

- More than 50% of the employees and customers argue that banking culture in Iran does not have any inconsistency with the implementation of biometric technology in banks, but it may have contradictoriness with the customers' culture

Relatively half of the participants believe that the culture could be one of the obstacles of implementation biometric authentication in the banking sector. So, it is critical to educate and train the employees and increase the awareness of customers in the case of this technology, before entering the implementation phase. It should be noted that this process may raise the final cost and time. Although, more than 63% of the participants thought that implementation of a biometric authentication system in banking sector is not economically possible, but they believed that the biometric authentication method could solve many problems of current authentication systems and provide them fast and convenient process, while doing banking operations.

### **4. Conclusion**

According to the importance of security for customers, banks and financial institutions are looking for the way to provide services with a high level of security. Biometric authentication as a strong authentication method could increase the security in banking transactions. Nevertheless, to achieve a successful implementation of such a biometric authentication system in the banking sector, the customers should adopt this technology. In this research, we investigated the perceptions of employees and customers of Saman bank in Shiraz, about the biometric technology and its implementation in the bank's environment. Both employees and customers, whether previously had been familiar with the biometric technology or not, whether they had academic education or not, believed that biometric authentication is a perfect authentication solution to confront security breaches and it could provide a high

degree of security in banking transactions. There was a definite interest among customers and employees for deploying biometric authentication in different banking operations, especially in branch banking and internet banking. Findings showed that the cost of a biometric system, the culture of banking system in Iran and also the customers' culture and their habits could have negative impacts on the acceptance of implementing such a biometric authentication system in the banking sector. It is obvious that overcoming employees' and customers' resistance is an essential issue facing biometric implementation, so awareness of customers and training the employees, in the case of biometrics, should be planned before this technology is introduced to the banks.

#### **Recommendation**

- Customers should be learned about biometric authentication before the implementation phase, so the customers' culture and their habits may change in the way of adopting biometric technology
- Before introducing biometric authentication systems to the banks and financial institutes, the managers should design several plans to train and educate the employees in the case of biometric technology
- Peoples who deals with the biometric system should be aware of the advantages of such a biometric system and also they should be informed of the instructions

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