Serial Commitments Clearance (SCC) in Rastin Banking

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Abstract

Purpose: The proposed system of Serial Commitments Clearance (SCC) provides necessary arrangements for settlement of obligations of those who, on the one hand serially owe someone, and on the other hand are creditors to other persons.
Design: By considering the laws and regulations of commitment clearance the theoretical discussions of serial chain of debits and credits.
Findings: By considering laws and regulations of commitment clearance, and introducing theory of serial chain of debits and credits, this system proposes an algorithm for recognition of serial commitments.
Research implications: This process is set in connection to the Collateral Registration System (CRS) and Mortgage Securitization System (MSS) in Rastin Banking, while considers legal and operational problems. Accordingly, banks, notary offices and other authorized authorities can clear serial obligations of persons due to their requests and agreements and release their collaterals and guarantees as far as the debts of the persons are equivalent.
Practical implications: This system will cause financial release and efficiency of many economic firms. In addition, banks will gain commission for rendering this service.
Social implications: SCC is a model that can be used in all countries, especially those which have more uncertainties and traders need more pledges for their transactions.
Value: This study fulfils an identified need to solve practical legal problems in vindication of rights.
Keywords: Rastin Banking, Serial Commitments, Collateral, Guarantee, Commitment, Commitment Clearing.
Article Type: Technical paper

Introduction

Rastin Banking[2] is a new operational Islamic banking system which, by studying theoretical and operational banking difficulties and on the basis of the latest scientific and technical innovations in the field, presents legal and operational solutions. Each of the complimentary systems[3] and financial subsystems[4] of Rastin Banking has been designed for solving specific problems.[5] Serial Commitments

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Clearance (SCC) system was designed to provide necessary arrangements for settlement of obligations of those who, on the one hand serially owe someone, and on the other hand are creditors to other persons.

Commitment, a Legal View

Commitment is created through a legal relationship resulted from a contract, cadence or by force according to which a person is obliged to transfer a property or wealth, or due to do or not to do a specific action. Terminologically, commitment means agreement and making a treaty; and the two words of commitment and agreement are used with their infinitive meanings as contract.[6] 'Commitment' is used as meanings of 'condition', 'obligation', 'treaty' and 'guarantee' regarding the concerned case, but any kind of enforced guarantee, transfer of property or wealth, forcing to do something or preventing from doing something in general, can be considered as the subjects of a commitment.[7] Commitment is the primary source of all legal relationships, which creates the rights of the two parties of a contract (obligor and obligee). Therefore, each contract or cadence which has been formed by a decision to do so (legal action), or happened without decision (legal event), has legal effects.[8] The concept of '*Zemme*' in Islamic Fiq'h (debt or due) and 'obligation' in many Islamic countries are other expressions of the concept of commitment,[9] which obligates the commitment of debts due to civil responsibilities and binding contracts.[10] Civil Law of Iran[11] expresses commitment as an initiated action from a contract and defines: 'contract is the agreement of commitment of one or some persons to one or more other persons to do something that is accepted by them'. Commitment is a duty of the obligor and a right of the obligee; and nonfulfillment of commitment causes the enforcement of the obligor and compensation of the losses of the obligee in case of making loss, according to the legal rule of causality.[12] Subjects such as proving, enforcement and termination of commitment are among the main subjects of commitment rights. The subjects such as suspension, substitution and clearing of commitments are among the secondary subjects, the latter is under consideration in SCC here in this study.[13] In addition to annulment option and canceling the contract, termination of commitment[14] includes subjects such as fulfillment of obligation (when the committed person fulfills his commitment, the commitment is terminated), mutual rescission (two parts of the contract agree to cancel the contract), release (obligee waives his own right), substitution (both parties agree to substitute the previous commitment), set off (clearance of two homogeneous debts between two persons in oppositeness) and acquisition of debt (unity in the attribute of the claimer and debtor of a commitment in one person).[15]

Serial Commitments Clearance

Serials commitments is referred to the commitments of several persons each of them is a debtor to the previous person and is a creditor to the next person–except the first person, who is only a creditor to the next person, and the last person, who is only in debt to the previous one.

Suppose that individuals of a society have no financial relationship with other societies and all their transactions are spot and not time-based-contracts. In this case, total debt of the people of the society is equal to the total claim (credit) to all people. For example, consider a three-person society where each person is in deal with another. Now, suppose that the first person claims $100 to the second person and the second person claims $100 to the third person. In this case, total credits and debts of the society is

[6] Jalil Ghanavati et al., Contract Rights in Imamate Feqh, Mostafa Mohaghegh Damad. Tehran, 2000, Vol. 1, P. 68.
[7] Mohammad Jafar Langeroudi, Civil Law Course, Commitment Legal Rights, Tehran, 2003, Vol. 1, P. 27.
[8] Mohammad Jafar Langeroudi, Civil Law Course, Commitment Legal Rights, Tehran, 2003, Vol. 1, P. 9.
[9] Jalil Ghanavati et al., Contract Rights in Imamate Feqh, Mostafa Mohaghegh Damad. Tehran, 2000, Vol.1, P. 67.
[10] Hasan Imami, Civil Law, Tehran, 1971.
[11] Naser, Katouzian, Civil Law, General Theory of Commitments, Tehran, 2003, Vol. 1, P. 67.
[12] Abualghasem Gorgi, Law Papers, Tehran, 1986, Vol.1, pp. 42-46.
[13] Abdulmajid Ghaemmaghami, Commitment Rights, Tehran, 1999, Vol. 1, P. 21.
[14] Naser, Katouzian, Civil Law, General Theory of Commitments, Tehran, 2003, Mizan Publications.
[15] Civil Law, article 264.

$200 above the accounting line, which is equal to the amount of registered collaterals and guarantees below the accounting line in the consolidated debit–credit account of the society. In the simplest case, suppose that person 1 accepts to claim to person 3 instead of claiming to person 2; then the commitments and claims of person 2 are settled and only the third person is indebted to the first person for $100. In this case, total debits and credits of the society is $100 above the accounting line, which is equal to the collaterals and guarantees booked below the accounting line. This means that by acceptance of the first person for transferring commitments to the third person–instead of the second person–the commitments of the second person is settled. SCC is based on the generalization of this example. In our example, suppose the first person is a bank, and the second and third persons are economic activists. In this case, by receiving commission from the second person, the bank can substitute the second person's commitments with the third person's when all the three are satisfied to this clearance.

SCC is a Complementary System in Rastin Banking and works under its regulations and operational bylaw.[16] Different properties, documents and assets are used as pledge guarantee to secure the right fulfillment of commitments in financial relations of people. In SCC, only those properties, documents and assets which are acceptable by bank according to Rastin Banking regulation can be used for clearing. The cited regulation defines the type of guarantees and collaterals for different cases, individuals and activities. Practically, bank substitutes the commitment of the second person by the guarantee and collateral of the third person and releases the collateral and guarantee of the second person and transfers its own claims from the second person to the third person and voids the claim document of the second person, as in our example.

Now, suppose that the number of persons of the mentioned example is more than three and let us say it is ten; and the first person (bank) claims $100 from the second person and the second person claims $100 from the third person and so on for the tenth person. If these persons agree, the bank can receive commission from the second to the ninth persons and transfer the commitments of the tenth person to the bank. In this way, the claims of the person 2 to 3, the person 3 to 4, and the person 4 to 5 ... up to the person 9 to 10 will be cleared and the guarantee and collateral of the second, third to the ninth persons are released.

According to Rastin Banking regulation, banks, notaries and other authorized authorities recognized by Properties and Deeds Registration Organization can clear the commitments of a series of people who request for a serial clearance of their commitments to the extent that their debts are equivalent; release their collaterals and guarantees and transfer the commitment of the last person in the series to his previous person–a process that continues to the first person in the chain.

This method causes financial release of economic firms and increases mobility and financial efficiency of the firms. The bank also yields revenue through rendering this service.

Serial Chain of Obligations and Claims

Theory of bankruptcy chain was explained about serial financial relationship of traders and how insurance hedges it.[17] Let us now adapt 'bankruptcy chain' in form of serial obligations and claims. Any firm (or person) at time t has some assets and liabilities. Its total assets (W_i) is equal to the value of all goods, physical capital and other acceptable items in firm's portfolio (C_i) plus its claims (F_i) to others.

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[16] Bijan Bidabad, Azarang Amirostovar, Saeed Abdollahi, Mahmoud Allahyarifard, Eskandar Pordel, Maryam Heidari, Alireza Shafiei, Mohammad Ali Pourbehrouz, (Book) Draft of Rastin Banking Executive Regulation, Bank Melli Iran, 2012.
http://www.bidabad.ir/doc/rastin-banking-regulation.pdf

[17] Bijan Bidabad, Nikos Mastorakis. Insurance and chain bankruptcy theory. Proceeding of the 3rd International Conference on Economics, Political, Law and Fiscal Sciences (EPLS '14), World Scientific and Engineering Academy and Society (WSEAS). Transilvania University of Brasov, Brasov, Romania, pp. 258-261, June 26-28, 2014. Advances in Environmental Sciences, Development and Chemistry, Proceedings of the 2014 International Conference on Energy, Environment, Development and Economics (EEDS 2014), Santorini Island, Greece, July 17-21, 2014. pp. 51-54.
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http://www.europment.org/library/2014/santorini/ENVIR.pdf

That is

$$W_i = C_i + F_i .$$ (1)

On the other side, debit (D_i) of the firm is equal to its financial obligations. Altogether, in an economy with n firms, all claims will be equal to all obligations, or

$$\sum_{i=1}^{n} F_i = \sum_{i=1}^{n} D_i .$$ (2)

The net worth (asset) of each firm is equal to

$$W_i^n = C_i + F_i - D_i .$$ (3)

By summing up the above equation for n, and replacing (2), the inventory of the economy will be equal to net worth of assets:

$$\sum_{i=1}^{n} W_i^n = \sum_{i=1}^{n} C_i .$$ (4)

Now, suppose n firms have transactions with each other and the ith firm buys C_i amount of goods from the $(i-1)^{th}$ firm and sells it to the $(i+1)^{th}$ firm. If the purchase is credit based, it will transmit bankruptcy from one firm to the next, when the first firm fails to fulfill its obligations. As commodities are sold on credit, they should be settled and paid at maturity. The ith buyer promises the $(i-1)^{th}$ seller to pay him D_i at maturity. On the other hand, he sells goods to the $(i+1)^{th}$ buyer and receives a payable written document equal to F_i and the commodity goes from firm i−1 to firm i and then to firm i+1. This simple sequence will go on several times for different values of i. To simplify the subject, let us assume that the face value of commodity C_i increases by α percent in each transaction between firms, and these firms have no other assets except this commodity and all their claims and obligations are just related to this commodity which creates their assets and liabilities accounting items. Now, we can express a chain for transaction of firms as follows:

$$C_0 = (1+\alpha)C_0 \rightarrow C_1 = (1+\alpha)C_0 \rightarrow C_2 = (1+\alpha)C_1 \rightarrow ... Cj = (1+\alpha)C_{j-1} \rightarrow ... C_n = (1+\alpha)C_{n-1}$$

$$C_0 \rightarrow (1+\alpha)C_0 \rightarrow (1+\alpha)^2 C_0 \rightarrow .... (1+\alpha)^j C_0 \rightarrow .... (1+\alpha)^n C_0$$
$$D_0 = 0 \rightarrow D_1 = C_0 \rightarrow D_2 = C_1 \rightarrow .... D_i = C_{i-1} \rightarrow .... D_n = C_{n-1}$$ (5)
$$F_0 = C_0 \rightarrow F_1 = (1+\alpha)C_0 \rightarrow F_2 = (1+\alpha)C_1 \rightarrow ..... F_j = (1+\alpha)C_{j-1} \rightarrow ... F_n = (1+\alpha)C_{n-1}$$
$$\pi_0 = C_0 \rightarrow \pi_1 = \alpha C_0 \rightarrow \pi_2 = \alpha C_1 .... \rightarrow \pi_j = \alpha C_{j-1} \rightarrow ... \pi_n = \alpha C_{n-1}$$

Sale of the firm zero to firm n^{th} is shown as the first row of (5) and each term in that row shows the value of the commodity for the firm j. This process is in the form of a difference equation; therefore, the second row–by replacing C_i in terms of C_0–is essentially the solution of the first row. The third row shows the debt flow of the firms and the fourth row shows the firms' claims. The fifth row shows the profit of the firms. Total profit of transactions in the economy will be equal to

$$\pi = \sum_{i=0}^{n} \pi_i = C_0 + \sum_{i=1}^{n} \alpha(1+\alpha)^{i-1}C_0 = C_0 + \alpha C_0 \sum_{i=1}^{n}(1+\alpha)^{i-1}$$

(6)

Total debts of the economy will be

$$D = \sum_{i=0}^{n} D_i = \sum_{i=0}^{n} C_{i-1} = \sum_{i=0}^{n}(1+\alpha)^{i-1}C_0 = C_0 \sum_{i=0}^{n}(1+\alpha)^{i-1}$$

(7)

Total claims in the economy will be

$$F = \sum_{i=0}^{n} F_i = \sum_{i=0}^{n}(1+\alpha)^{i}C_0 = C_0 \sum_{i=0}^{n}(1+\alpha)^{i}$$

(8)

All the above relations have a geometric progression summation term as

$$\sum_{i=0}^{n}(1+\alpha)^{i} = \frac{(1+\alpha)^{n+1}-1}{\alpha}$$

(9)

Therefore, we have:

$$\pi = C_0(1+\alpha)^{n}$$,

(10)

$$D = C_0\left(\frac{(1+\alpha)^{n}-1}{\alpha}\right)$$,

(11)

$$F = C_0\left(\frac{(1+\alpha)^{n+1}-1}{\alpha}\right)$$.

(12)

Again, we can find the trueness of the above relations by replacing (11) and (12) into (10) which results to the net credits of the economy as

$$\pi = F - D$$.

(13)

Now, suppose that the inventory of the last firm C_n is spoiled or damaged due to any reason. Therefore, the nth person's claims which were supposed to be created after selling goods to the next firm and could compensate its debts (D_n) and leave some profit $\pi_n = \alpha(1+\alpha)^{n-1}$ for the firm n have been ruined. That is to say, his claims, which are regarded as its assets (in his accounts), become zero but his debts and obligations remain unchanged. Therefore,

$$F_n = 0$$,

(14)

$$\pi_n = -D_n .$$

(15)

Now, its loss is equal to its debt to the firm n−1. His unfulfilled financial obligations in equations (5) will follow a reverse trend; that is equal to D_n of claims to the $(n-1)^{th}$ firm (F_{n-1}) is not paid and profit of the $(n-1)^{th}$ firm is also lost. Using equations (5) we can write

$$F_n = (1+\alpha)D_n = (1+\alpha)(1+\alpha)C_{n-2} = (1+\alpha)F_{n-1} .$$

(16)

Therefore,

$$F_{n-1} = \frac{1}{(1+\alpha)}F_n .$$

(17)

That is to say, the claim of the firm n−1 to the firm n is not fulfilled, because of the destroyed commodities of the nth firm. That is actually it has zero receipt. General form of the above equation is applicable to all firms as

$$F_{i-1} = \frac{1}{(1+\alpha)}F_i .$$

(18)

Since this is a recursive equation, when $F_n = 0$, all $F_0,...,F_{n-1}$ will be zero too. That is, in business of the commodity C, all merchants get bankrupt and since they cannot receive their claims, they cannot pay their debts as well. Therefore, all merchants in relation to this commodity will get bankrupt. In this case, the losses of all merchants will be

$$\pi_j = -D_j ,$$

(19)

which can be extracted from the set of equations in (5). The nominal loss to the economy will be

$$\sum_{i=0}^{n} \pi_i = -\sum_{i=0}^{n} D_i = -C_0 (\frac{(1+\alpha)^n - 1}{\alpha}) .$$

(20)

As shown by (5), the third row depicts the debt flow of firms, and the fourth row depicts the claims flow of the firms. Considering the third row, the ith buyer promises the previous seller $(i-1)^{th}$ to pay him D_i at maturity. He also sells the commodity to the next buyer $(i+1)^{th}$ and receives a document that he claims F_i to the $(i+1)^{th}$ buyer as shown by the fourth row.

Commitments are defined according to the market norms and have a vast range of oral commitment, official and ordinary documents, various kinds of cheques, notes and legal documents, bank and non-bank guarantees, and moveable and immoveable collaterals. There will be always a series of commitment documents in the economy from the committed person–related to the third row of the sequences of (5) and shown by the fourth row from the obligee side. If $\alpha > 0$, the sequence of serial documents will form the set: $\{F_i \mid i = 1,..., n\}$. Each ith person has a debt equal to D_i from one hand, and has a claim of F_i from the other hand. If we assume $\alpha = 0$, the document of claim of the ith person will be equal to the nominal value of his debt document. This assumption can be used for clearing the debt of the

i^{th} and $(i+1)^{th}$ person through SCC.

Serial Commitments Recognition Algorithm

Consider two n × n square matrices of **D** and **F** in which n is number of economic activists:

$$\mathbf{F} = \begin{bmatrix} 0 & f_{12} & \cdots & f_{1,n-1} & f_{1n} \\ f_{21} & 0 & & f_{2,n-1} & f_{2n} \\ \vdots & & \ddots & & \vdots \\ f_{n-1,1} & f_{n-1,2} & & 0 & f_{n-1,n} \\ f_{n1} & f_{n2} & \cdots & f_{n,n-1} & 0 \end{bmatrix} = \mathbf{D}^T = \begin{bmatrix} 0 & d_{21} & \cdots & d_{n-1,1} & d_{n1} \\ d_{12} & 0 & & d_{n-1,2} & d_{n2} \\ \vdots & & \ddots & & \vdots \\ d_{1,n-1} & d_{2,n-1} & & 0 & d_{n,n-1} \\ d_{1n} & d_{2n} & \cdots & d_{n-1,n} & 0 \end{bmatrix} . \quad (21)$$

Each element of f_{ij} in matrix **F** represents the claim of person i to j, and each element of d_{ij} in matrix **D** represents the debt of person j to person i. Theoretically, the following equality exists between the two persons i and j:

$$f_{ij} = d_{ji} \quad (22)$$

If we sum up both sides of the above equality for i and j, we will have:

$$f = \sum_{i=1}^{n} \sum_{j=1}^{n} f_{ij} = \sum_{i=1}^{n} \sum_{j=1}^{n} d_{ji} = d . \quad (23)$$

The scalars 'f' and 'd' in (23) are equal to the total amount of all the people's claims and debts which are theoretically equal. This relation redefines relation (2).

To show identification procedure for serial commitments in matrix **F**, consider the case for a 6 × 6 **F** matrix including bank and 5 persons in which bank is shown by 'B' in the last row and column as

$$\begin{array}{c c c c c c c} & 1 & 2 & 3 & 4 & 5 & B \\ 1 & 0 & & f_{13} & & f_{15} & \\ 2 & & 0 & & f_{24} & & \\ 3 & & f_{32} & 0 & & & \\ 4 & & & & 0 & & \\ 5 & & f_{52} & & & 0 & \\ B & f_{B1} & & & & & 0 \end{array} . \quad (24)$$

Now, suppose that the bank claims f_{B1} to person 1. Bank searches the related database of **F** matrix, and reviews line 1 which is the column index of f_{B1} and realizes that the first person claims f_{13} and f_{15} to person 3 and 5 respectively. The columns indices of f_{13} and f_{15} (3 and 1) are selected to obtain the claims of the third and fifth persons to next persons in next round. Therefore, bank reviews rows 3 and 5 of **F** matrix. Bank finds out that person 3 and 5 claim f_{32} and f_{52} to person 2, respectively. So, bank selects the columns indices of f_{32} and f_{52} (which both are 2) and reviews person 2 in the new round. Bank realizes that person 2 claims f_{24} to person 4. Bank selects the column index of f_{24} (person 4) and reviews the row 4 and realizes that all items of this row are zero. Therefore, person 4 is the last person of the chain. The result of the bank survey of person 1 is briefed as

$$f_{B1} \leftarrow \begin{matrix} f_{13} & \leftarrow & f_{32} \\ f_{15} & \leftarrow & f_{52} \end{matrix} \leftarrow f_{24} . \quad (25)$$

In other words, the algorithm stages will be

Step 1: Search the elements of the row B. And select the column j in **F**.
Step 2: Select the row with positive element in column j of **F**.
Step 3: Search the selected row and find the positive element (elements) in it.
Step 4: Go to step 2 and repeat the algorithm until the chains of serial commitments are completely found.

In our 6×6 **F** matrix example, two separate chains are obtained:

$$B \to 1 \to 3 \to 2 \to 4 . \tag{26}$$
$$B \to 1 \to 5 \to 2 \to 4 . \tag{27}$$

The chained claims of bank are derived from the first person and from person 1 to the third and fifth persons (both); and from the latter two persons (3 and 5) to the second person; and from the second person to the fourth person. Now, assume that there is the following quantitative relation among the persons in our example:

$$f_{B1} = (f_{13} + f_{15}) = (f_{32} + f_{52}) = f_{24} . \tag{28}$$

Or, at least, there exists a minimum claim of 'f^*_{B1}' as:

$$f^*_{B1} = \min \{ f_{B1}, (f_{13} + f_{15}), (f_{32} + f_{52}), f_{24} \}. \tag{29}$$

In this case, we can clear the claims in (25) with the amount of f_{B1} regarding the assumption (28) or with the amount of f^*_{B1} in case of assumption (29), and let only bank claims to person 4 instead; and claims of the persons 1, 2, 3 and 5 be cleared and their guarantees and collaterals be released. The matrix **F** after clearance will be as follows:

$$
\begin{array}{c|cccccc}
 & 1 & 2 & 3 & 4 & 5 & B \\
1 & 0 & & & & & \\
2 & & 0 & & & & \\
3 & & & 0 & & & \\
4 & & & & 0 & & \\
5 & & & & & 0 & \\
B & & & f_{B1} & & 0 & \\
\end{array}
\tag{30}
$$

Operational Considerations

From the operational perspective the following notes should be considered regarding the explained algorithm.

First, a proper database should be provided for serial commitments search. This is considered and designed in Rastin Banking as Collateral Registration System (CRS). CRS is an integrated web-based online database in which, banks, notaries and other authorized organizations and authorities are obliged to register the pledged properties when they accept them as collateral or guarantee.

Second, a procedure should be selected for breaking large-value commitments to smaller pieces. This will cause to find long serial commitments sequences and increases the efficiency of SCC both for bank and clients. In this context, the Mortgage Securitization System (MSS)[18] in Rastin Banking can be used to issue 'Guarantee Certificates'. The benefit of this system is that a high-valued pledged property can be divided into many small-valued Guarantee Certificates and each of them can be used in separate

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[18] Bijan Bidabad, Mortgage Securitization System (MSS), Complementary System of Rastin Banking,. 2012.
http://www.bidabad.ir/doc/mss-paper-en.pdf

transaction as separate pledge. Guarantee Certificate is an unanimous document concerning guarantee of a specific amount of commitment (debit) for a defined time period and is issued by the bank against accepting some property as collateral and in case of nonfulfillment of commitment, the owner is obliged to pay the nominal value of the certificate, otherwise, the pledged property will be sold by bank through tender and the commitment will be fulfilled by the money obtained from the auction. This certificate is defined and issued through the MSS in Rastin Banking.

Third, in the above algorithm, it has been implicitly assumed that the person 1 has only one commitment to bank, while practically, number of commitments of each person may be more than one. In other words, by extending the cited algorithm, we can expand number of rows of matrix **F**. Another solution is to sum up all claims of person 1 and process the algorithm for each summed-up row. The process of the algorithm will be similar as before for all added rows or summed-up commitments of the first person to bank.

Fourth, the possibility of clearing commitments should be checked and accepted by bank from a legal perspective. Therefore, by using assessment [19], legal [20] and auditing and computation [21] departments/units which are defined and described in Rastin Banking organization, bank can fulfill this task in an appropriate way. Applying special restrictions, the bank can implement the SCC system subject to extra conditions. For example, the bank can select special kinds of collaterals and guarantees for implementing SCC. Moreover, obtaining the acceptance of contract parties is among the cases which must be considered and the bank has to provide necessary facilities to achieve it while negotiates clients.

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[19] - Assessment unit is a unit in PLS department of Rastin PLS bank which assesses the competence and capabilities of entrepreneur and his proposal.

[20] Legal unit is a unit in PLS department of Rastin Banking and includes aware insurance and law experts in Rastin Banking.

[21] Auditing and Computation Unit is a unit in PLS department of Rastin PLS bank and includes accountants and auditing experts.

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