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71) Applicant: BIRLA SUN LIFE INSURANCE COMPANY LTD [IN/IN]; One Indiabulls Centre, tower 1, 15 and 16 floors, Jupiter Mill Compound, 841 S B Marg, Elphinstone Road, Mumbai 400 013, Maharashtra (IN).

72) Inventors: JAIN, Mayank; A-1204, Bhoomi Valley, Thakur Village, Kandivali (East), Mumbai 400 101, Maharashtra (IN). KRISHNAMURTHY, Pramod; A–1403, Dosti Elite, Road No 29, Sion East, Mumbai 400 022, Maharashtra (IN). SHARMA, Varun; 406, J-2, Lok Vruksha, Gladys Alwares Road, Thane (West), Maharashtra 400 607 (IN).


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— if inventorship (Rule 4.17(iv))

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(54) Title: TRANSACTION MANAGEMENT SYSTEM AND METHOD FOR IMPROVING THE PERFORMANCE EFFICIENCY OF A TRANSACTION

(57) Abstract: Transaction management system and method for improving the performance efficiency of a transaction. The system comprises selection means to select an agreed turnaround time for completion of an outlying of pending cases at the end of the agreed turnaround time depending upon the criticality of the transaction. The upper turnaround time is the time limit beyond which customer index generating means to create a noise index of potential customer complaint of the pending cases beyond the upper turnaround time by dividing the outlying of pending cases into groups of equal delay interval, ascertaining the potential customer discontent in each of the groups with a delay factor of 0.125 (which is a constant) by multiplying the constant of 0.125 and the number of the respective group. Also monitoring means to rigorously track the noise index of potential customer complaint systematically and methodically complete the outlying of pending cases within the upper turnaround time and to reduce potential customer discontent.
TITLE OF THE INVENTION

Transaction management system and method for improving the performance efficiency of a transaction

TECHNICAL FIELD OF INVENTION

This invention relates to a transaction management system and method for improving the performance efficiency of a transaction.

BACKGROUND OF INVENTION

A transaction is described as the performance or execution of a unit of a work or a task. Transactions are necessarily performed in all the activities and spheres of life including industries, whether manufacturing industries or service industries, commercial or financial establishments, educational institutions, research and educational institutions or research and development centers or institutions. Examples of transactions are opening of a bank account or clearing of a cheque in the banking industry, clearing a customer complaint in the telecommunication industry, receipt of insurance policies by the customers or settlement of compensation claims in the insurance industry, execution of an order in a manufacturing industry, delivery of goods in cargo, courier or logistics industry, attending to a call in call centers, settlement of bills in an industry in general or generation of data related to new employees in an organization or industry in general. Transactions are usually associated with turnaround time lines or delivery time lines for completion thereof in order to ensure performance of the transactions efficiently and to minimize customer dissatisfaction and complaint which will spoil the reputation, goodwill and image of any business or industry.

However, due to various reasons like lack of efficiency in the manner the transactions are carried out, lack of systematic and close monitoring and follow up, lack of man power or time, human error
or human or system or procedural inefficiency, many transactions are invariably not completed within the agreed, preset or predetermined turn-around time lines or delivery time lines. Transactions that are not completed within the predetermined delivery time lines give rise to customer discontent or complaint which increases with the delay. The number of outliers or pending cases and the delay in compliance is a clear indication of transaction inefficiency and customer discontent and it would be the objective and aim of any good industry or organization to minimize and if possible eliminate customer discontent and complaint. Transactions fall into various categories of criticality depending upon the nature of the transactions. Settlement of an insurance claim or clearance of a high value cheque may be considered as examples of transactions of high criticality, whereas opening of a bank account or delivery of a cheque book may be considered as examples of transactions of moderate criticality. However, it is very important to anticipate and address customer discontent effectively, especially in the case of highly critical transactions and to reduce delay in the completion of transactions.

Outliers are currently being generally addressed by dividing the cases pending after the predetermined delivery timelines into groups and highlighting them in the order of ageing. As an example, in a transaction with a tail of 250 pending cases for completion after the preset turn-around time line, the tail may be divided into groups and tracked by the ageing of pendency of the cases as shown in the Table 1 below:

<table>
<thead>
<tr>
<th>Pending days</th>
<th>1 - 3 (Group 1)</th>
<th>4 - 6 (Group 2)</th>
<th>7 - 9 (Group 3)</th>
<th>10 - 12 (Group 4)</th>
<th>&gt;\2 (Group 5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of cases</td>
<td>15</td>
<td>21</td>
<td>16</td>
<td>32</td>
<td>166</td>
</tr>
</tbody>
</table>
Since compliance of the pending cases in the outlier is addressed in the order of ageing and there is no systematic method of dealing with the pending cases in the outlier and there is no procedure in place to anticipate in advance potential customer discontent and complaint likely to intensify and aggravate, the outlier is not managed in a systematic, focused and efficient manner. The outliers of a transaction are also not quantified systematically at different periods of a transaction. As there is no effective control over the completion of the outlier expeditiously, the customer discontent is likely to increase and intensify over a period of time. As the outliers are not systematically quantified, it is also not possible to compare performance efficiencies of two or more transactions with the same preset turn-around time line. There is thus need for a transaction management system and a method for improving the performance efficiency of a transaction in a structured, aggressive and comprehensive manner in order to effectively address customer complaints and to reduce delay or delivery gap in the completion of the transactions.

DETAILED DESCRIPTION OF INVENTION

According to the invention there is provided a transaction management system for improving the performance efficiency of a transaction, comprising:

(i) selection means to select an agreed turnaround time for completion of the transaction and an upper turnaround time for completion of the outlier of pending cases at the end of the agreed turnaround time depending upon the criticality of the transaction, the upper turnaround time being the time limit beyond which customer discontent is expected to aggravate and intensify;

(ii) a noise index generating means to create a noise index of potential customer complaint expected to aggravate and intensify from the outlier of the pending cases beyond the upper turnaround time
by dividing the outlier of pending cases into groups of equal delay interval, ascertaining the potential customer discontent in each of the groups by multiplying the number of pending cases in the first group with a delay factor of 0.125 (which is a constant) and by multiplying the pending cases in each of the subsequent groups with multiples of the constant 0.125 and the number of the respective group and adding the potential customer discontent of all the groups; and

(iii) monitoring means to rigorously track the noise index of potential customer complaint to systematically and methodically complete the outlier of pending cases within the upper turnaround time and to reduce potential customer discontent.

According to the invention there is also provided a transaction management method for improving the performance efficiency of a transaction, comprising:

(i) selecting an agreed turnaround time for completion of the transaction and an upper turnaround time for the completion of the outlier of pending cases at the end of the agreed turnaround time depending upon the criticality of the transaction, the upper turnaround time being the time limit beyond which customer discontent is expected to aggravate and intensify;

(ii) creating a noise index of potential customer complaint expected to aggravate and intensify from the outlier of the pending cases beyond the upper turnaround time by dividing the outlier of pending cases into groups of equal delay interval, ascertaining the potential customer discontent in each of the groups by multiplying the number of pending cases in the first group with a delay factor of 0.125 (which is a constant) and by multiplying the pending cases in each of the subsequent groups with multiples of the constant 0.125 and the number of the respective group and adding the potential customer discontent of all the groups; and
(iii) monitoring the noise index of potential customer complaint rigorously and closely to systematically and methodically track and complete the outlier of pending cases within the upper turnaround time and to reduce potential customer discontent.

According to the invention, the upper turnaround time selected for completion of the transaction depends upon the criticality of the transaction that is to say the importance and seriousness of the transaction. Typically in the case of a highly critical transaction the upper turnaround time may be 1.5 times of the agreed turnaround time and in the case of a moderately critical transaction, the upper turnaround time may be 2 times of the agreed turnaround time. It has been observed by us after extensive research and experimentation that the customer discontent or complaint in the case of transactions pending in the outlier beyond the upper turnaround time will in all likelihood and probability aggravate and intensify. The more the delay the higher the potential customer complaint. The noise index gives the potential or expected customer complaints likely to aggravate and intensify beyond the upper turnaround time. By dividing the outlier into groups and by creating the noise index of potential customer complaint it is possible to anticipate in advance the potential customer complaint and tightly and closely track or monitor the progress or improvement in the compliance of the pending transactions to customer satisfaction and to reduce the delay in the completion of the transactions. The upper turnaround time helps to sensitive the execution of the transaction depending upon criticality of the transaction and to monitor and improve the performance of the transaction.

It has also been observed by us after extensive research and experimentation that there is one potential customer discontent or complaint (expected customer complaint) in every eight adhered
transactions or cases in the form of various reasons like errors in the documents, delay in the receipt of the documents by the customer or delay in the receipt of payment by the customer. The potential customer discontent increases with the delay. According to an embodiment of the invention, the method comprises carrying out reassessment of the adhered transactions by subtracting the noise index from the adhered transactions and recalculating the revised performance as follows:

\[
\text{adhered transactions} - \text{noise index} = \frac{\text{total transactions}}{100}
\]

Both the noise index of potential customer discontent and revised performance will enable to track and manage the outlier and adhered cases in a systematic, accurate and efficient manner with focus. As a result, customer complaints in respect of transactions both in terms of delay and non-compliance in a given time period can be effectively and efficiently addressed and attended to the satisfaction of the customers and delays in transactions can be reduced.

According to the invention it is also possible to quantify the outliers at different periods of a transaction. This not only helps to monitor the progress in the compliance of a transaction in a systematic manner but also to compare performance efficiencies of two or more transactions with the same agreed turn-around timeline.

The noise factor (constant) of 0.125 was found out by us after extensive research and experiments. The invention can be used in any industry including manufacturing and service industry, commercial and financial establishments, educational institutions, research and educational institutions, research and development centers or institutions or in any sphere or activity of life having delivery or completion or execution timelines so as to manage the adhered transactions and pending transactions efficiently and effectively. The invention can be implemented manually or automatically. It can be also carried out automatically in a software enabled computer network.
The following typical transactions are illustrative examples of the invention but not limitative of the scope thereof:

Example 1

33449 insurance policies issued by us were received by the customers over a period of 30 days. The agreed turnaround time for the policies to be received by the customers from the date of application was 20 days. The upper turnaround time for the receipt of the policies by the customers from the date of application was selected to be 40 days (2 times the agreed turnaround time). 31564 policies were received by the customers within 20 days of application (adhered cases). The adherence performance of the transaction within the agreed turnaround time was \( \frac{31564 \times 100}{33449} = 94.4\% \)

The noise block or outlier of pending cases beyond the agreed turnaround time was 1885 (33449-31556). A noise index of potential customer discontent expected to arise beyond the upper turnaround time was created by dividing the noise block into 4 groups of 5 days of delay interval as shown in the Table 2 below:

<table>
<thead>
<tr>
<th>Pending days</th>
<th>21-25 (Group 1)</th>
<th>26-30 (Group 2)</th>
<th>31-35 (Group 3)</th>
<th>36-40 (Group 4)</th>
<th>&gt;40 (Group 5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases</td>
<td>758</td>
<td>390</td>
<td>220</td>
<td>159</td>
<td>358</td>
</tr>
</tbody>
</table>

Expected customer complaints or potential customer discontent in respect of pending cases in the first group was calculated by multiplying the delayed cases in the first group with the noise factor (constant) 0.125 and in respect of delayed cases in each of the subsequent groups of delayed cases was calculated by multiplying the delayed cases with multiples of the constant 0.125 and the number of the respective group of delayed cases to get potential customer discontent. The potential
customer complaints of all the groups were added together to get the total expected customer complaints as shown in the Table 3 below:

<table>
<thead>
<tr>
<th>Groups of delayed cases</th>
<th>Pending cases</th>
<th>Potential customer complaints</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>758</td>
<td>$758 \times 0.125 = 94.75$</td>
</tr>
<tr>
<td>2</td>
<td>390</td>
<td>$390 \times 0.25 = 97.5$</td>
</tr>
<tr>
<td>3</td>
<td>220</td>
<td>$220 \times 0.375 = 82.5$</td>
</tr>
<tr>
<td>4</td>
<td>159</td>
<td>$159 \times 0.5 = 79.5$</td>
</tr>
<tr>
<td>5</td>
<td>358</td>
<td>$358 \times 1 = 358$</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total = 712.25</strong></td>
</tr>
</tbody>
</table>

Thus the total expected or potential complaint was 712.25 in an outlier of 1885 cases.

The performance of the adhered transactions was reassessed by subtracting the noise index from the adhered cases as follows:

$$31564 - 712.5 = 30851.75$$

The revised performance was recalculated as follows:

$$\frac{30851.75 \times 100}{33449 \times 100} = 92.23\%$$

**Example 2**

4488 bills were presented to us for settlement on a particular day and were to be settled within an agreed turnaround time of 4 days from the date of presentation of the bills. The upper turnaround time for the settlement of the bills was selected to be 8 days (2 times the agreed turnaround time). 4268 bills were settled within 4 days (adhered cases). The adherence performance of the transaction within the agreed turnaround time was

$$\frac{4268}{4488} = 95\%$$
The noise block or outlier of pending cases beyond the agreed turnaround time was 220 (4488-4268). A noise index of potential customer complaint was created by dividing the noise block into 4 groups of 2 days of delay interval as shown in the Table 4 below:

<table>
<thead>
<tr>
<th>Pending days</th>
<th>4-5 (Group 1)</th>
<th>5-6 (Group 2)</th>
<th>6-7 (Group 3)</th>
<th>7-8 (Group 4)</th>
<th>&gt;8 (Group 5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases</td>
<td>31</td>
<td>29</td>
<td>13</td>
<td>12</td>
<td>135</td>
</tr>
</tbody>
</table>

Expected customer complaints or potential customer discontent in respect of pending cases for settlement in the first group was calculated by multiplying the delayed cases in the first group with the noise factor (constant) 0.125 and in respect of delayed cases in each of the subsequent groups of delayed cases was calculated by multiplying the delayed cases with multiples of the constant 0.125 and the number of the respective group to get potential customer discontents. The potential customer complaints of all the groups were added together to get the total expected customer complaints as shown in Table 5 below:

<table>
<thead>
<tr>
<th>Groups of delayed cases</th>
<th>Pending cases</th>
<th>Potential customer complaints</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>31</td>
<td>31 x 0.125 = 3.875</td>
</tr>
<tr>
<td>2</td>
<td>29</td>
<td>29 x 0.25 = 7.25</td>
</tr>
<tr>
<td>3</td>
<td>13</td>
<td>13 x 0.375 = 4.875</td>
</tr>
<tr>
<td>4</td>
<td>12</td>
<td>12 x 0.5 = 6</td>
</tr>
<tr>
<td>5</td>
<td>135</td>
<td>135 x 1 = 135</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>= 157</strong></td>
<td></td>
</tr>
</tbody>
</table>

Thus the total expected or potential complaint was 157 in an outlier of 220 cases.

The performance of the adhered transactions was reassessed by subtracting the noise index from the adhered cases as follows:
The revised performance was recalculated as follows:

\[
\frac{4111 \times 100}{4488} = 91.5\%
\]

Example 3

381 new employees joined us on a particular day. Details of the new employees were to be entered in the employee database and identity codes were to be generated within an agreed turnaround time of 7 days from the date of joining of the new employees. The upper turnaround time for the completion of the entries of details on the database and generation of identity codes was selected to be 14 days (2 times the agreed turnaround time). 301 entries of new employees and generation of identity codes were completed within 7 days (adhered cases). The adherence performance of the transaction within the agreed turnaround time was

\[
\frac{301}{381} = 79\%
\]

The noise block or outlier of pending cases beyond the agreed turnaround time was 80 (381-301). A noise index of potential customer discontent was created by dividing the noise block into 4 groups of 3 days of delay interval as shown in the Table 6 below:

<table>
<thead>
<tr>
<th>Pending days</th>
<th>7-9 (Group 1)</th>
<th>9-11 (Group 2)</th>
<th>11-12 (Group 3)</th>
<th>12-14 (Group 4)</th>
<th>&gt;14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases</td>
<td>30</td>
<td>22</td>
<td>5</td>
<td>8</td>
<td>15</td>
</tr>
</tbody>
</table>

Expected customer complaints or potential customer discontent in respect of pending cases in the first group was calculated by multiplying the delayed cases in the first group with the noise factor (constant) 0.125 and in respect of delayed cases in each of the subsequent groups of delayed cases was calculated by multiplying the delayed cases with multiples of the constant 0.125 and the number of the respective group to get potential customer discontents. The potential customer discontent was calculated as follows:

\[
\text{Potential Customer Discontent} = \sum_{i=1}^{4} (\text{Cases in Group } i \times \text{Noise Factor} \times \text{Number of Cases in Group } i)
\]

Where, the noise factor is 0.125 and the number of cases in each group is as shown in the table.
complaints of all the groups were added together to get the total expected customer complaints as shown in Table 7 below:

Table 7

<table>
<thead>
<tr>
<th>Groups of delayed cases</th>
<th>Pending cases</th>
<th>Potential customer complaints</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>30</td>
<td>$30 \times 0.125 = 3.75$</td>
</tr>
<tr>
<td>2</td>
<td>22</td>
<td>$22 \times 0.25 = 5.5$</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>$5 \times 0.375 = 1.875$</td>
</tr>
<tr>
<td>4</td>
<td>8</td>
<td>$8 \times 0.5 = 4$</td>
</tr>
<tr>
<td>5</td>
<td>15</td>
<td>$15 \times 1 = 15$</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>$30.125$</td>
</tr>
</tbody>
</table>

Thus the total expected or potential complaint was 30.125 in an outlier of 80 cases.

The performance of the adhered transactions was reassessed by subtracting the noise index from the adhered cases as follows:

$301 - 30.125 = 270.875$

The revised performance was recalculated as follows:

$\frac{270.875 \times 100}{381} = 71\%$

The noise index and upper turnaround time in all the above Examples help to monitor the progress of the compliance of the transactions in the outlier to customer satisfaction and to reduce the delay in the completion of the transactions very closely and rigorously in a systematic and methodical manner. The revised performance helps to make a comprehensive assessment of the performance of the transaction. Both the findings help to track and manage efficiently and effectively delayed transactions and non-compliance in the transactions already transacted within the turnaround time and to reduce delays in transactions and to improve performance efficiency thereof.
Claims:

1. A transaction management system for improving the performance efficiency of a transaction, comprising:

   (i) selection means to select an agreed turnaround time for completion of the transaction and an upper turnaround time for completion of the outlier of pending cases at the end of the agreed turnaround time depending upon the criticality of the transaction, the upper turnaround time being the time limit beyond which customer discontent is expected to aggravate and intensify;

   (ii) a noise index generating means to create a noise index of potential customer complaint expected to aggravate and intensify from the outlier of the pending cases beyond the upper turnaround time by dividing the outlier of pending cases into groups of equal delay interval, ascertaining the potential customer discontent in each of the groups by multiplying the number of pending cases in the first group with a delay factor of 0.125 (which is a constant) and by multiplying the pending cases in each of the subsequent groups with multiples of the constant 0.125 and the number of the respective group and adding the potential customer discontent of all the groups; and

   (iii) monitoring means to rigorously track the noise index of potential customer complaint to systematically and methodically complete the outlier of pending cases within the upper turnaround time and to reduce potential customer discontent.

2. The transaction management system as claimed in claim 1, wherein the selection means selects the upper turnaround time to be 1.5 times of the agreed turnaround time in the case of a highly critical transaction and 2 times of the agreed turnaround time in the case of a moderately critical transaction.
3. The transaction management system as claimed in claim 1 or 2, which comprises reassessment means to reassess the adhered transactions completed at the end of the agreed turnaround time by subtracting the noise index of potential customer complaint from adhered transactions and recalculating the revised performance as follows:

\[
\text{adhered transactions} - \frac{\text{noise index}}{\text{total transactions}} \times 100
\]

4. The transaction management system as claimed in anyone of claims 1 to 3, which is automatically operated.

5. The transaction management system as claimed in claim 4, wherein the automatically operated transaction system comprises a software enabled computer network.

6. A transaction management method for improving the performance efficiency of a transaction, comprising:

(i) selecting an agreed turnaround time for completion of the transaction and an upper turnaround time for the completion of the outlier of pending cases at the end of the agreed turnaround time depending upon the criticality of the transaction, the upper turnaround time being the time limit beyond which customer discontent is expected to aggravate and intensify;

(ii) creating a noise index of potential customer complaint expected to aggravate and intensify from the outlier of the pending cases beyond the upper turnaround time by dividing the outlier of pending cases into groups of equal delay interval, ascertaining the potential customer discontent in each of the groups by multiplying the number of pending cases in the first group with a delay factor of 0.125 (which is a constant) and by multiplying the pending cases in each of the subsequent
groups with multiples of the constant 0.125 and the number of the respective group and adding the potential customer discontent of all the groups; and

(iii) monitoring the noise index of potential customer complaint rigorously and closely to systematically and methodically track and complete the outlier of pending cases within the upper turnaround time and to reduce potential customer discontent.

7. The method as claimed in claim 6, wherein the upper turnaround time is selected to be 1.5 times of the agreed turnaround time in the case of a highly critical transaction and 2 times of the agreed turnaround time in the case of a moderately critical transaction.

8. The method as claimed in claim 6 or 7, which comprises reassessment of the adhered transactions completed at the end of the agreed turnaround time by subtracting the noise index of potential customer complaint from adhered transactions and recalculating the revised performance as follows:

\[
\frac{\text{adhered transactions} - \text{noise index}}{\text{total transactions}} \times 100
\]

9. The method as claimed in anyone of claims 6 to 8, which is carried out automatically.

10. The method as claimed in anyone of claims 6 to 8, which is carried out manually.
**INTERNATIONAL SEARCH REPORT**

### A. CLASSIFICATION OF SUBJECT MATTER

**INV. G06Q50/00**

**ADD.**

According to International Patent Classification (IPC) or both national classification and IPC

<table>
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<th>Category*</th>
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- **A** document defining the general state of the art which is not considered to be of particular relevance
- **E** earlier application or patent but published on or after the international filing date
- **L** document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- **C** document referring to an oral disclosure, use, exhibition or other means
- **P** document published prior to the international filing date but later than the priority date claimed

**Further documents are listed in the continuation of Box C.**

**See patent family annex.**

**Date of the actual completion of the international search**

**15 May 2013**

**Name and mailing address of the ISA/Office**

European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040; Fax; (+31-70) 340-3016

**Date of mailing of the international search report**

**29/05/2013**

**Authorized officer**

Lavin Li ermo, Jesus
<table>
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