

Housing Department

3.4 Information Technology Audit of Lottery and Flat Allotment System in the Maharashtra Housing and Area Development Authority

Highlights

Application form as well as application systems lacked essential information about applicants.

(Paragraph 3.4.8.1)

Duplicate applications for tenements under the same category had been considered in respect of 34 and 112 cases for the lottery held in the years 2006 and 2005 respectively.

(Paragraph 3.4.9.2)

Same applicants had applied for tenements under more than one income group in respect of 680 and 348 cases considered for lottery drawn in the years 2006 and 2005 respectively.

(Paragraph 3.4.9.3)

Tenements were allotted to applicants even when they were tenement holders with MHADB through the lotteries held in 2005 and 2006. In the lottery held in 2005, two tenements were allotted to the same applicant.

(Paragraph 3.4.9.4)

Sixty two out of 160 tenements having a total sale price of Rs 2 crore, located at Mankhurd and meant for the 'Low Income Group' in respect of the lottery held in July 2006 were yet to be allotted.

(Paragraph 3.4.10.2)

3.4.1 Introduction

The Maharashtra Housing and Area Development Authority (MHADA) was established on 5 December 1977 by the Maharashtra Housing and Area Development Act, 1976. The Authority has nine regional boards. The Mumbai Housing and Area Development Board (MHADB), is one of the executive arms of MHADA. The activities of this Board include construction of residential buildings under different schemes for different sections of the society within the jurisdiction of Mumbai city and the Mumbai Suburban District.

The sale of tenements was governed by the Maharashtra Housing and Area Development (Estate Management, Sale, Transfer and Exchange of Tenements) Regulations, 1981 (Regulations). During the years 2005 and 2006,

the number of tenements advertised for sale by MHADB was 3184, costing Rs 403 crore and 1871, costing Rs 234 crore respectively.

Computerisation of the various functions of MHADB was initiated in December 1995. Application software being used by MHADB for their activities relating to the processing of applications for tenements, picking of lotteries and allotment of tenements were 'Application Form', 'Lottery Management System' and 'Marketing Cell' respectively. The salient features of these applications which were operational in MHADB as of April 2008 were as under:

3.4.1.1 'Application Form' application

The 'Application Form' application in use since January 2005 was developed by the National Informatics Centre (NIC), Pune using MS Access as RDBMS and Visual Basic as the front end tool on a Windows operating system. The software was supplied to various bank branches assigned for collecting applications on behalf of MHADB. The preliminary data captured by the bank was thereafter scrutinised by the Marketing Cell of MHADB before transfer to the 'Lottery Management System' for drawing the lotteries.

3.4.1.2 'Lottery Management System' application

The 'Lottery Management System' application was developed in June 2006 by M/s Vigigraphics using Sybase as RDBMS and Power Builder as the front end tool on the Windows operating system. For the drawal of lotteries, information such as various schemes, categories and number of applicants to be drawn for winner lists/wait lists were entered in the system. Thereafter, the system internally generated random numbers and picked the applicants on a random basis to generate the lists of winners and waitlisted applicants. This application was in use since July 2006.

3.4.1.3 'Marketing Cell' application

The 'Marketing Cell' application for processing post lottery activities of the Marketing Cell was developed by NIC using SQL Server as RDBMS and Visual Basic 6 as the front end tool on a Windows operating system. The application was designed for recording allotment of tenements, issuing offer letters and allotment letters to the winners of lotteries and for capturing payments made by the allottees. It was in use since June 2005. The data pertaining to lottery winners and wait-listed applicants is imported into the application from text files generated from the 'Lottery Management System' application. Data relating to lotteries held in 2005 and 2006 were available in this application system.

3.4.2 Organisational set-up

MHADB is headed by a Chief Officer and its Marketing Cell is headed by a Director. The computer operations are managed by the Computer Wing of MHADB which is headed by a Chief Engineer who is assisted by a Deputy Chief Engineer.

3.4.3 Scope of audit

Information Technology (IT) Audit of the Lottery and Tenements Allotment system of MHADB was conducted during April 2008, covering data in respect of applications for tenements and allotment of tenements in respect of two lotteries held on 14 June 2005 and 11 July 2006 by MHADB.

3.4.4 Audit objectives

The audit objectives were to evaluate:

- the effectiveness of the application in respect of lotteries and tenement allotments.
- the methodology for development/ modification of the application
- the incorporation of business rules in the application.
- the adequacy of audit trails available in the system.
- the adequacy of security controls to ensure the integrity of data.

3.4.5 Audit methodology

The audit commenced with an entry conference held on 9 April 2008 with the officials concerned of MHADA and MHADB. The data from the auditee was analysed using Computer Assisted Audit Techniques (CAATs). The application and data were examined with reference to the Maharashtra Housing and Area Development (Estate Management, Sale, Transfer and Exchange of Tenements) Regulations, 1981. The audit findings were discussed with the officials of the MHADB in an exit conference held on 9 September 2008.

3.4.6 Audit Findings

As the applications viz., 'Application Form', 'Lottery Management System' and 'Marketing Cell' were related to important activities of MHADB, it was imperative that the software being used incorporated all the user requirements completely, mapped all the business rules, maintained data integrity and generated all the information required from such systems to ensure transparency, accountability and service to the citizen. Deficiencies in this regard are discussed in the following paragraphs.

3.4.7 System development

An application software is required to go through all the stages of system development such as identification of user requirements, system requirements, testing and implementation to ensure that all lacunae are identified and rectified at the time of systems development and all business rules are incorporated in the software.

The 'Application Form' and 'Marketing Cell' applications developed by NIC and the new lottery management system (LMS) with enhanced functionalities and security features developed in June 2006 by M/s Vigigraphics did not have any documentation relating to the various stages of system development.

The 'application form' and 'marketing cell' applications did not have any documentation of various stages of system development

In reply, the Deputy Chief Engineer, Computer Cell, MHADB stated (April 2008) that the documents in respect of ‘Application Form’ and ‘Marketing Cell’ applications had not been prepared by NIC and the size and complexity of the LMS software was very small and hence the System Development Life Cycle (SDLC) was not felt necessary.

The fact remains that by not following a systematic system development adequately supported by proper documentation, all business rules were not mapped into the system. The application developed had deficiencies and insights into the functioning of the application was not available that could also ensure business continuity in case of any emergent situation.

3.4.8 Input information

In a database, where the data entry is manual, the data is entered through the input source documents. It is important that the input source documents are structured, capture all the necessary information and correspond to the input form of the application system. The input source document should be appropriately authenticated and authorised. This ensures that the data fed into the application system is correct, complete and uniform.

3.4.8.1 Insufficient applicant data

The application form (input source document) for the tenements which was used as an input form for data entry by MHADB as well as the application system were deficient in respect of the following:

- A column for date of birth was not prescribed in the application form. Instead, the years completed by an applicant was required to be filled. Further, whereas the brochure for the tenements mentioned that the applicant should be more than 18 years of age on the date of submission of application, the application form indicated that an applicant below 18 years of age on the date of advertisement would not be eligible to apply.
- There was no column in the application form for writing the applicant’s gender.
- There was no provision in the application system to capture an applicant’s monthly family income though the application form had a column prescribed for this purpose.
- To uniquely identify an applicant, a PAN or Voter ID number was required. It was noticed that there was no provision in the application system to capture the PAN though the application form had a column prescribed in this regard.
- The application form was not in a structured format which would have aided in better capture of data and subsequent analysis once it was transferred to the computerised system.
- The application system did not have a provision to capture an applicant’s photograph.

The application form (input source document) had many deficiencies

The deficiencies in the data captured was a constraint in detecting the invalid applications viz., applicants applying more than once under the same scheme and category, applicants applying across multiple income groups and underage applicants. Such invalid applications were identified in audit using parameters such as name, age and address of applicants.

3.4.8.2 Deficient input records in 'Marketing Cell' application

A study of the data entry procedure in respect of the Marketing Cell application revealed that MHADB did not have a laid down procedure and prescribed document for feeding data into the application system. Further, it was noticed that the details were also being maintained manually in a register.

A comparison of both data and the details in the register of the lottery held in June 2005 in respect of Scheme No. 195 for 'General Public' (GP) and 'Scheduled Caste' (SC) categories revealed the following:

- The details relating to the application number, lottery priority number, payment details, allotment date and possession dates were not entered in the manual register and it was not being reviewed regularly by the higher authorities. Entries relating to 188 out of 253 in the case of GP and 39 out of 54 in the case of the SC category have not been authorised by the Director, Marketing.
- There were differences in the allotment figures shown in the manual register and the application system as shown below:

Category	Number of tenements available	Number of Allotments	
		As per the computer application	As per the register
GP	253	234	253
SC	55	53	55

In addition to this, the application did not also have provision for authorisation of data input.

The Director Marketing, MHADB stated (July 2008) that due to heavy workload, some details were not recorded and the differences were due to the data loss.

This proved that the data in the application system was incomplete and unreliable.

3.4.9 Mapping of business rules

Inadequate system development methodology followed by MHADA led to inadequate mapping of business rules and relevant controls. Mapping of business rules, regulations etc. in the application systems ensure that such rules are followed while processing the data captured in the system. It was observed during audit that many such rules were not mapped into the application system thus allowing undue benefit to applicants as discussed in the following paragraphs:

The Board did not have any laid down procedure for feeding data into the application system

Business rules and regulations were not mapped into the application system allowing undue benefits to the applicants

3.4.9.1 Non-detection of applicants below 18 years of age by application software

The application system failed to detect applicants below 18 years of age

As per the regulations in force, persons below the age of 18 years would not be eligible to apply for any tenements. Scrutiny of data revealed that in the lottery held in June 2005, four applicants below 18 years were considered out of which one person was among the declared winners and one person was selected as a waiting list candidate. In the lottery held in July 2006, 318 such applicants were considered, out of which 26 were winners and 28 were selected as waiting list candidates.

The Director Marketing, MHADB stated (July 2008) that allotment of tenements was made only after scrutiny of the applicants' forms and it was found that the applicants were all above 18 years.

This shows the absence of validation of the data in the system before using the same in lotteries.

3.4.9.2 Non-detection of duplicate applications

The application software could not detect duplicate applications

As per the terms and conditions, only one application could be submitted by an applicant for any particular category, failing which all the applications of that applicant under that category would be rejected. Analysis of the database of applicants revealed that:

- 112 cases of duplicate applications were found in the data used for the lottery in 2005. Fifteen applicants from these cases were selected in the confirmed list and four were selected in the waiting list.
- 34 cases of duplicate applications were found in the data used for the lottery in 2006. Out of these, two applicants were selected in the waiting list.

Absence of input controls to disallow duplicates has resulted in undue benefit to such applicants. The Director Marketing, MHADB accepted (July 2008) the absence of such provision in the application and stated that the issues would be examined in detail.

3.4.9.3 Non-detection of applicants applying under different income groups

MHADB provided housing to various income groups⁵⁰ at different rates. The applicants under each income group were eligible for applying for the relevant tenements for those income groups only. Data analysis revealed that:

- 172 applicants who had applied under more than one income group were considered for the lottery held in 2005. Out of these, 134 applicants got selected in the lottery.

⁵⁰ Lower Income Group (LIG), Middle Income Group (MIG) and Higher Income Group (HIG)

- Three hundred and thirty eight applicants who had applied under more than one income group were considered for the lottery held in 2006. Out of these, 85 applicants got selected in the lottery.

The Director Marketing, MHADB accepted (July 2008) the facts and stated that there was no provision in the application software to detect such duplication.

3.4.9.4 Non-detection of applicants owning more than one tenement

Regulations stipulated that a person already in possession of any tenement either from MHADB or in the municipal area under jurisdiction of Mumbai would not be eligible to apply for any tenement. Data analysis revealed that:

- Two tenements were allotted to one applicant in the lottery held in 2005 (**Appendix 3.12**).
- Two tenements were allotted to two applicants in 2005 as well as 2006 (**Appendix 3.13**).
- Four applicants already owning tenements prior to 2005 were again allotted tenements in 2005 and 2006 (**Appendix 3.14**).

The Director Marketing, MHADB accepted (July 2008) the facts and stated that necessary action would be taken.

3.4.9.5 Floor-wise allotments of tenements not according to the priority of lottery numbers

As per the regulations in force the allotment of tenements have to be done floor-wise using priority numbers, commencing from the first floor upwards and the ground floor would be allotted after all the upper floor tenements was completed.

Test-check of allotment details of 400 tenements under scheme code 197 under the GP category revealed that 24 tenements (**Appendix 3.15**) were not allotted according to the priority numbers.

The Director Marketing, MHADB replied (July 2008) that change of tenement on applicant's request was considered on payment of Rs 5000, provided vacant tenement was available. The reply of MHADB was not acceptable as sufficient number of successful as well as waitlisted applicants were available for this category and the facts could not be verified as well since the records to that effect were not furnished.

3.4.10 Other points of interest

3.4.10.1 Allotments to waitlisted applicants not in serial order

Allotment of tenements was to be carried out according to their priority numbers. However, an analysis of the post-lottery database for the lotteries held in 2005 and 2006 revealed that such allotments had not been carried out in the order of priority in respect of fifteen cases (**Appendix 3.16**).

The application software failed to detect duplicate applicants who were already owning more than one tenement

In fifteen cases (2005 & 2006) the allotment of tenements was not made as per priority

MHADB did not provide the records pertaining to wait-listed applicants not considered and the Director Marketing, MHADB stated (July 2008) that an explanation would be given after detailed examination of the matter.

3.4.10.2 Delay in allotment of tenements

As per rules in force payments for allotments should be made within 90 days from the issue of provisional offer and could be further extended by 45 days.

In the lottery held in July 2006, out of the 969 applicants for 160 tenements under scheme code 138 (GP), 160 applications were selected as confirmed and another 160 as waiting list. It was noticed that only 98 tenements had been allotted within 20 months from the month of lottery and 62 tenements with a total sale price of Rs 2 crore were still to be allotted as on March 2008. It was also noticed that no Management Information System (MIS) reports had been designed in the 'Marketing Cell' application to monitor the timely allotment of tenements.

The Director Marketing, MHADB stated (July 2008) that the files in respect of the 62 tenements were under process. Audit holds that such delays would result in blocking of funds and in the absence of MIS reports the computerised system could not be fruitfully utilised to monitor the allotment process.

3.4.11 Security

Every organisation should stipulate an IT security policy, clearly stating the organisation's priorities. By enunciating an IT security policy, the organisation would demonstrate its ability to reasonably protect all critical business information.

3.4.11.1 Lack of IT Security policy

It was noticed that no security policy had been formulated to ensure the security of the data by adopting a password policy, incorporating logical access controls, segregation of duties and roles of the users, monitoring and follow up of security violations, if any, promoting user awareness through training, etc.

The Deputy Chief Engineer, Computer Cell, MHADB stated (May 2008) that an IT security policy would be formulated.

3.4.11.2 Lack of audit trails

Access to all the modules of the 'Marketing Cell' application was through a single user name and password. Thus, the application lacked audit trails, which were required to identify the users responsible for entering, modifying and deleting data regarding applicants.

The Deputy Chief Engineer, Computer Cell, MHADB stated (April 2008) that the deficiencies pointed out, would be considered during future development of software.

The Marketing cell application did not have any MIS feature so as to monitor the timely allotment of tenements

MHADB did not have any IT security policy

The Marketing cell application lacked audit trails

Data lost during a hard disk crash in October 2006 could not be retrieved

3.4.11.3 Inadequate backup initiatives

It was noticed that due to lack of regular backup, the data lost during a hard disk crash in October 2006 could not be retrieved. Though back-ups were taken after the incident, the backups were kept in the server room itself and no records were kept regarding the frequency of backups taken, the media used for backups and the persons assigned for taking backups.

The Deputy Chief Engineer, Computer Cell, MHADB stated (May 2008) that a Disaster Recovery plan would be formulated.

3.4.12 Conclusion

MHADB could not utilise IT for ensuring the credibility of its activities relating to allotment of tenements even 12 years after the initiation of the computerisation project. The deficiencies brought out in the report above, point to an adhoc approach towards the utilisation of computerised systems which delivered an unreliable system, with deficient data that could not invoke all the business rules of the MHADB and its schemes. The reliance on scrutiny by its officials and maintenance of manual records in addition to that in the computerised system, further made the recourse to computerisation questionable. Inappropriate utilisation of IT applications thus led to genuine applicants being denied a fair chance through the lottery.

3.4.13 Recommendations

MHADB should:

- follow a documented systems development methodology in respect of development of application software;
- modify the system by incorporating controls for ensuring correct mapping of all business rules like age restriction on applicants, disqualification of applicants in case of duplicate application for tenements, applications under different income groups, applicants owning more than one tenement etc.;
- use appropriate and structured input source documents to facilitate complete and correct data inputs;
- take regular backups of data and store the same off site;
- formulate and implement IT security policy and disaster recovery plan;
- design appropriate MIS to make an effective use of the computerised system.

The matter was referred to the Secretary to the Government in July 2008. Reply had not been received (August 2008). However, during the exit conference, the Chief Officer, MHADB while accepting the audit observations stated that the existing system was old and the points would be taken care of in the on-going computerisation project.

Appendix 3.12 (Reference: Paragraph 3.4.9.4; Page 111)							
Statement showing double allotment made to one applicant in the lottery held in 2005							
Sr. No.	Scheme code	Project location	Building Number	Tenement Number	Application No.	Applicant's name	Lottery date
1	190	SION	L3A	104	30786	SUDHIR SHIVAJI BHAT	14-6-2005
2	191	SION	L4D	104	41949	SUDHIR SHIVAJI BHAT	14-6-2005

Appendix 3.13 (Reference: Paragraph 3.4.9.4; Page 111)							
Details of two tenements allotted to two applicants in 2005 as well as 2006							
Sr. No.	Scheme code	Project location	Bldg No.	Tenement No.	Application No.	Applicant name	Lottery date
1	193	PRATIKNAGAR	M5B	705	72713	NAGDA KARAMSHI KIRTI	11-7-2006
2	197	MALAD	26B	702	26628	NAGDA KARAMSHI KIRTI	14-6-2005
3	196	MALAD	7B	403	38674	PALANDE PARSHURAM VIJAY	14-6-2005
4	197	MALAD	23A	104	106177	PALANDE PARSHURAM VIJAY	11-7-2006

Appendix 3.14 (Reference: Paragraph 3.4.9.4; Page 111)							
Details showing four applicants who were already owning tenements prior to 2005 and again allotted tenements in 2005 and 2006							
Sr. No.	Scheme code	Project location	Building Number	Tenement Number	Application Number	Applicant's name	Lottery date
1	175	GOREGAON	29D	704	29D-704	BORNARE NAGESH ATMARAM	Prior to 2005
2	195	DINDOSHI	2C	404	41442	BORNARE NAGESH ATMARAM	14-06- 2005
3	159	MAL	5	703	22972	NANCHE DEEPAK LAXMAN	Prior to 2005
4	195	DINDOSHI	3A	402	38566	NANCHE DEEPAK LAXMAN	14-06- 2005
5	159	MAL	52	009	25394	QURESHI JAVED KIFAYATU LLAH	Prior to 2005
6	197	DINDOSHI	28B	402	67471	QURESHI JAVED KIFAYATU LLAH	11-07- 2006
7	159	MAL	44	001	25244	YADAV SHAMBHU NATH MOTI	Prior to 2005
8	194	SION	H2	703	97094	YADAV SHAMBHU NATH MOTI	11-07- 2006

Annexure 3.15

(Reference: Paragraph 3.4.9.5 ; Page 111)

Statement showing floor-wise allotments of tenements not according to the priority of lottery numbers

Sr. No.	Surname	First name	Priority Number allotted in the lottery	Tenement Number	Floor Number	Floor number of the immediately preceding allottee	Floor number of the immediately following allottee
1	Bhogle	Sunil	9	603	6	1	1
2	Sharma	Pratibha	25	401	4	1	1
3	Tuskano	Thomas	28	303	3	1	1
4	Singh	Reema	36	402	4	1	1
5	Khemka	Rajesh	66	702	7	2	2
6	Painyer	Deepak	72	404	4	2	
7	Shroff	Manju	73	704	7		2
8	Ghosalka	Swapnil	76	303	3	2	2
9	Kadam	Suresh	91	403	4	2	2
10	Kedia	Umesh	156	404	4	3	3
11	Eage	Narasaiah	165	401	4	3	3
12	Nerwani	Amar	166	604	6		3
13	Wadkar	Sumit	175	602	6	3	4
14	Govalikar	Rakesh	361	102	1	6	
15	Rai	Ravindra	362	104	1		6
16	Maurya	Rambrij	375	202	2	7	7
17	Agarwal	Sonia	377	402	4	7	7
18	Podar	Manak	380	301	3	7	7
19	Shah	Ashish	388	304	3	7	7
20	Saraf	Vaibhavi	421	401	4	7	7
21	Shetty	Sunil	426	503	5	7	7
22	Sawant	Prakash	439	401	4	7	7
23	Gaware	Ravi	442	401	4	7	7
24	Purohit	Vipin	445	604	6	7	7

<p align="center">Appendix 3.16 <i>(Reference: Paragraph 3.4.10.1; Page 111)</i></p>						
<p align="center">Statement showing allotments to waitlisted applicants not in serial order</p>						
Sr No.	Year of lottery	Scheme code	Category	Priority numbers in the Waiting list not considered		Gap
				From	To	
1	2005	190	GP	165	207	43
2		195	GP	312	321	10
3			SC	64	68	5
4		196	GP	212	217	6
5				290	300	11
6				302	320	19
7				323	335	13
8				339	343	5
9				347	370	24
10	2006	138	GP	17	21	5
11				37	41	5
12				52	57	6
13				66	92	27
14		197	GP	231	269	39
15			SC	83	119	37