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Ranking of Risk Factors in Real Estate: AHP Analysis

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ABSTRACT

Risk management is one of the important issues for real estate sector. It is necessary to take the steps towards the risk minimization. The main contribution of the present paper is to provide a risk management framework to the decision makers in the real estate sector. This paper has used the AHP methodology to rank the various risk management factors of real estate sector. In total twenty five practices were identified from the literature and expert survey. The ranking of these practices has been done by using AHP technique. The list of important risk management factors presented in the study is very important for the real estate sector. The main objective of this framework was to address all key risk management practices in real estate sector.However, one of the major drawbacks of AHP is biasness in expert opinions. A small sample size limits the findings of this paper. The generalizability of findings is only available in real sector, and not to other sectors. This provides a direction for further research where one can extend the use of AHP technique to prioritize factors in other sectors.

KEYWORDS : Risk Management, Real Estate Sector, AHP (Analytic Hierarchy Process

INTRODUCTION

Risk management is one of the important aspects in context of real estate sector. Risk assessment and its ma nagement are crucial for the sector. Since this sector demands huge investment therefore risk is also high for this sector. In addition, development of real estate sector affects wide section of society since its inception to development phase. Therefore, it is required to concentrate on the ranking of the risk management factors to fill this gap. In order to achieve this objective, the present study uses the Analytical Hierarchy Process method to evaluate the relative importance of the risk management factors in the context of real estate sector. The main objective of the paper is to optimize the risk management by evaluating the impact of the factors and dimension of risk management, so that companies can focus on these factors and able to improve the risk management in context of real estate sector. In addition, ranking of the relative importance of the risk management factors that can be implemented in real estate sector so that this sector can ensure the proper allocation of resources.

In order to achieve this objective, the present paper assesses the risk management issue in context of the real estate sector. Risk management is the concept that focuses on the effect of uncertainty of the various risks. The main role of the real estate developer is to minimize these risks to improve the experience of the various stakeholders as well as to generate more profit by managing risk due to different reasons. The real estate sector is growing with the growth of the land rates. There are various companies of different capacity those are creating a cut throat competition in the real estate market. This paper presents an AHP analysis of the impact of various factors on the various dimension of the risk management. This analysis is based on the relative importance of these factors with respect to the overall goal of the study. This study will also help the managers in the identification of most critical factors for risk management.

LITERATURE REVIEW

This section deals with background of the study in order to identify the different categories of risk management. Each and every category also known as risk factors consists of a few variables. These variables are those items used in past studies. Here, we provide a summary of all these variables to be used as scale items for present analysis.

Categories of Risk Management

This study identified five factors, as discussed in chapter 3, those are important for the real estate sector. These practices were identified from the literature focused on the real estate sector.

- Social Risk: Risk due to changes in social factors comes under the social risk. Mainly these are the challenges created by the stakeholders of the society due to various impact of the business on society. Various stakeholders create different risk for the project. Proper management of social risk may reduce the vulnerability of the project.

- Technological Risk: The technological environment is rapidly changing. Increasing investment in research and development, innovative ideas are some catalysts which increase the technological risk of the project.

- Environmental Risk: Real estate projects use the natural resources in large quantity. Conversion of agricultural land into commercial land, deforestation for the development of housing colonies, and shopping mall creating various environmental problems and contributing to the changing climate conditions.

- Economic Risk: This is one of the important risks especially in the case of real estate projects. Earning of profit is the prime motive of any organization and it is also necessary for the survival of it. The changing land prices, increasing rate of compensation are some of the reason which raise the economic risk of the project.

- Political Risk: Real estate sector is one which has high level of interaction with the political system of the country. Various rules and regulation imposed by the government, changes in the ruling party are the reasons behind the political risk of the real estate project.

Variables of Different Risk Factors

Aiming to generate specific items that comprise the 5 proposed risk factors of customerexperience in real estate sector, an extensive review of literature dealing with these factorswas conducted. The articles reviewed to gather the items for each factor are shown in Table 1. Thistable includes five major criterion variables and their 34 sub-criterion (scale items).These are summarized as follows:

Table 1: Risks Assessment Criteria for the real estate development

Criteria	Sub-Criteria	Valuation methods	Representativereferences
Social Risks	Workforce availability	Degree of Developer's satisfaction to local workforce market (%)	Danter (2007)
	Community acceptability	Degree of benefits for local communities (%)	Danter (2007)
	Cultural compatibility	Degree of business & lifestyle harmony (%)	Danter, 2007
	Public hygiene	Degree of impacts to local public health & safety (%)	NHS Standards

Technological Risks	Site conditions	Degree of difficulties in site preparation for each specific plan (%)	Danter (2007)
	Designers and Constructors	Degree of Developer' satisfaction to their performances (%)	Khalafallah, et al. (2002)
	Multiple functionality	Degree of multiple use of the property (%)	Danter (2007)
	Constructability	Degree of technical difficulties in construction (%)	Lam, et al., 2006
	Duration	Total duration of design and construction per 1,000 days (%)	Khalafallah, et al. (2002)
	Amendments	Possibility of amendments in design and construction (%)	Khalafallah, et al. (2002)
	Facilities management	Degree of complexities in facilities management (%)	Moss, et al. (2007)
	Accessibility & Evacuation	Degree of easy access and quick emergency evacuation in use (%)	Moss, et al. (2007)
	Durability	Probability of refurbishment requirements during buildingslifecycle (%)	Chen (2007)
Environmental Risks	Adverse environment impacts	Overall value of the Environmental Impacts Index	Chen, et al. (2005)
	Pollution	Degree of impact of all types of pollution (%)	Chen, et al. (2005)
	Climate change	Degree of impacts to use and value due to regional climatic variation (%)	UNEP (2007)
Economic Risks	Interest rate	Degree of impacts due to increment of loan rate (%)	Sagalyn (1990); FSA (2005); Nabarrol& Keys, (2005); FSB (2007)
	Property type	Degree of location concentration (%)	Adair & Hutchison (2005); Frodsham (2007)
	Market liquidity	Selling rate of same kind of properties in the local market (%)	Adair & Hutchison (2005)
	Currency conversion	Degree of impacts due to exchange rate fluctuation	Morledge, et al. (2006); FSA (2005); FSB (2007)
	Demand and Supply	Degree of regional competitiveness (%)	Adair & Hutchison (2005)
	Purchaseability	Degree of affordability to the same kind of properties (%)	http://www.statistics.gov.uk/
	Brand visibility	Degree of Developer's reputation in specific development (%)	D&B (2007); Adair & Hutchison (2005); Gibson &Louragand, (2002)
	Capital exposure	Rate of estimated lifecycle cost per 1 billion pound (%) Blundell, et al. (2005);	Moore (2006)
	Lifecycle value	5-year property depreciation rate (%)	Lee (2002); Adair & Hutchison (2005)
	Area accessibility	Degree of regional infrastructures usability (%)	Adair & Hutchison (2005)
	Buyers	Expected selling rate (%)	Frodsham (2007)
	Tenants	Expected annual lease rate (%)	Booth, et al. (2002)
	Investment return	Expected capitalization rate (%)	Sagalyn (1990); Watkins, et al. (2004)
Political Risks	Political Groups/ Activist	Degree of protest by the urban communities (%)	Arthurson (2001)
	Commercial TaxPolicy	Rate of Commercial Tax impact (%)	Gehner, et al (2007) ; FSB (2007)
	Local Tax Policy	Rate of Council Local Tax (%)	LCC (2008)
	Council Approval	Total Days of construction, design approval process byLiverpool City Council (LCC)	Crown (2008)
	License Approving	Total Days of license approval process	Crown (2008)

SELECTION OF WEIGHTING METHOD

There are various weighting techniques have been adopted in literature for the ranking of the factors of particular concept. These methods include discriminant analysis, factor analysis, regression and Analytical hierarchy process (AHP). Adoption of nay one of above stated technique depends on three main criteria: flexibility, internal consistency and applicability (Singh et. al, 2007).

Discriminant analysis is based on the idea that variable of the study pursue the normal distribution. This assumption does not hold any validation in the context of qualitative factors (Garg, *et. al,* 2012). Moreover, discriminant analysis does not provide proper results in case of outlier (Pociecha, 2005).

Factor analysis is applicable in case of highly correlated factor of particular concept. But the main problem is that correlation may not be valid in the real situation. In addition, factor analysis shows high level of sensitivity with the changes in data, sample size. Therefore, it is not worth to use factor analysis in case of non linear data (Hair et. al., 1987).

The main problem with the regression analysis is the interpretation of results. In addition, any specific error in equation formulation impacts the whole system. Therefore, it is not advisable to use regression analysis in case of complex problems.

Analytical hierarchy process (AHP) is one of the widely used techniques for the ranking of the factors of any concept. This is a multi-criteria decision making technique. The most important feature of this technique is that it can handle both qualitative and quantitative information (Saaty, 2008). In this technique, main problem of the study can be simplified by decomposing the main problem into various hierarchy levels with the help of existing theories to facilitate the decision maker in having better understanding (Singh et. al., 2007).

There are various studies in the literature those have used different weighting tools in different studies as presented in table. AHP is used to calculate the priority of different factors of risk management. The main reasons are:

(1) The risk management includes both objective and subjective parameters which can be properly handled by AHP.
(2) This technique decomposes complex problems in a hierarchy which helps researcher in having a better understanding of the problem.
(3) AHP provides the check for the consistency in expert's responses while they perform comparative analysis by calculating Eigen vector (Saaty, 1994).
(4) One more feature of AHP is its large number of factors accommodating capacity.
(5) This technique has been applied by different scholars around the globe in more than 30 areas to get solution of complex problems. These studies have been published in the journal of international repute.
(6) It helps in a systematic assessment of problem by decomposing it into the criteria and sub criteria level (Singh et. al, 2007).

Table2: Application of different weighing methods

Weighting Methods	Factors	Key References
Multiple Regression Analysis	Factors of knowledge management in SME sector.	Wong and Aspinwall (2005)

Weighting Methods	Factors	Key References
Discriminant Analysis	Success factors for project classification. Strategic alliances factors in SMEs.	Dvir (1998) Hoffmann (2001)
Factor Analysis	Factors influencing the performance of safety program. Factors influencing the cost performance in Indian construction companies.	Aksorn and Hadikusumo, (2008) Iyer and Jha, (2005)
Analytic Hierarchy Process (AHP)	Ranking of critical success factors of EIS. Ranking of factors of customer experience in banking sector	Salmeron and Herrero, (2005) Garg et. al, (2012)

For the solving a complex problem of ranking of various factors, AHP is one of the best technique among the all available tools for the prioritization. In addition, this will also fill the gap in the existing literature which shows the unavailability of any study related to the ranking of risk management factors in the context of real estate sector.

To achieve the objective, this paper is organized as follows: The next section presents a brief summary of the risk management factors. Next to this, an introduction of AHP technique has been provided. Further, the relative important of the risk management factors have been presented.

AHP METHODOLOGY

Analytical hierarchy process (AHP) is a tool of multi-criteria decision making (MCDM), which was developed by Saaty. This technique is used to find the solution of complex problems in different fields (Cheng et. al, 2007). In this technique complex problem is decomposed in the various hierarchy level followed by the comparative assessment of various factors at every level. These comparative matrices are developed by the various experts in the field of study. Further, consistency of the matrices can be assessed. This consistency check is one of the important features available with the AHP.

RANKINGOF DIFFERENT FACTORS OF RISK MANAGEMENT

The present study uses the AHP method for the ranking of different factors of risk management in the context of real estate sector.

Defining the goal

The goal of the study is to rank the various risk management factor in the context of real estate sector.

Decompose the main goal into criteria and sub criteria

While dealing to a complex issue, for application of AHP it is necessary to decompose problem into a hierarchy structure. Then it follows the pair wise comparison at each level on the 1-9 scale proposed by Saaty (1980). The top level of hierarchy represents the goal that we want to achieve. Further, goal further decomposed into criteria and sub criteria. The risk management is decomposed into 5 criteria and their 25 sub criteria, identified from the literature. These criteria have been discussed in the earlier section of this paper.

Development of a Hierarchy for the assessment

Hierarchy can be developed by literature, expert opinion and survey. The level of hierarchy depends on the problem in hand. After deciding the goal of the study the related criteria and sub criteria has been arranged to develop the hierarchical structure. Saaty (2008) provided certain guidelines to select the level of criteria and sub-criteria.

Collection of Data

The data collection is one of the important steps in the development of the AHP model. For this purpose data has been collected from the various experts from both industry and academia to provide the pairwise comparison of the various criteria and sub-criteria on 1-9 scale. In total 30 experts were selected. Among them 15 experts are from real estate sector those are responsible to the risk management areas. 15 experts are selected from the academia. These experts are having wide experience in the field of risk management in various sectors. These experts are considered as having enough knowledge to assess the criteria and sub-criteria with respect to the goal of the study and can provide the relative importance. Time duration of every interview was from 20-25 minutes.

Pairwise comparison at criteria and sub-criteria level

In Analytical hierarchy process, various factors were compared on the basis of their relative importance to each other. After the development of hierarchical structure, comparison was performed. The resulting matrix was a reciprocal matrix with the diagonal value '1' and other values having reciprocity. For example if factor i is n-times important to factor j than j factor will be 1/n-time important to the factor i. Lower value indicate lower importance of one factor over another factor. Table 2 provides the detail of the preference on 1-9 scale. After the development of comparison matrices, in next step Eigen vector for the all factors were calculated for the calculation of weights.

Table 3.1: 9-point scale for AHP analysis

Scale Value	Importance
1	Equally importance
3	Moderate importance
5	Strong importance
7	Very strong importance
9	Absolute importance
2,4,6,8	Intermediate values

Table 3.2: Pair-wise comparison of five criteria with respect to risk management

Criteria	Social	Technological	Environment	Economic	Political
Social	1.00	3.00	0.20	0.33	3.00
Technological	0.33	1.00	0.33	0.33	3.00
Environment	5.00	3.00	1.00	3.00	5.00
Economic	3.00	3.00	0.33	1.00	5.00
Political	0.33	0.33	0.20	0.20	1.00

Table 3.3: Normalized Matrix

Criteria	Social	Technological	Environment	Economic	Political
Social	0.103448	0.290323	0.096774	0.068493	0.176471
Technological	0.034483	0.096774	0.16129	0.068493	0.176471
Environment	0.517241	0.290323	0.483871	0.616438	0.294118
Economic	0.310345	0.290323	0.16129	0.205479	0.294118
Political	0.034483	0.032258	0.096774	0.041096	0.058824

Table 3.4: Consistency Ratio Random Number Index

N	1	2	3	4	5	6	7	8	9	10
RI	0	0	0.58	0.9	1.12	1.24	1.32	1.41	1.45	1.49

Table3.5: Priority Weight

Factors Categories/Criteria	Priority Weights
Social	0.147102
Technological	0.107502
Environment	0.440398
Economic	0.252311
Political	0.052687
Sum	1

ASSESSING THE CONSISTENCY IN THE PAIR-WISE COMPARISON

Assessment of the consistency of the responses is one of the important features of the analytical hierarchy process. The any carelessness or biased results may lead to the incorrect results. The AHP technique provide a check known as consistency ratio (CR) to assess the consistency in the responses provided by the decision makers. The value of the consistency ratio may vary from 0 to 1. According to Saaty, the acceptable range of the CR is 0.1. If value of CR comes more than 0.1, the experts need to re-evaluate the pair-wise comparisons. CR can be

computed by the using the equation CR= CI/RI. Here CI represents the consistency index. CI can be calculated by using the following equation:

$CI = \lambda_{max}$ - n/n-1

Here n= number of criteria or sub-criteria

λ_{max} = Average valueofall λcalculated

Depending on the number of factors in that level, the value of RI can be took out from the Table 4 λcan be calculated by the following stages:

Calculate δ by multiplying initial comparison matrix by priority weight column.

The value of λfor the five criteria has been presented. The highest Eigen value (λ_{max}) is selected for the computation of the consistency index (CI). CI value in the acceptable range shows the consistency in the decision makers' assessment The CI value less than 0.10 shows the enough consistency for the estimation of goal. Value of CI greater than 0.10 shows the inconsistency in the priority matrix and may lead to biased results. In this case there is a need to get the revised of expert's evaluation. The same steps were pursued for the assessment of the weights of the sub-criteria for level 3 of the hierarchical structure. The results are given in the Table.

Table3.6: Pair-wise comparison of four sub-criteria with respect to Social Risk

	Workforce availability	Community acceptability	Cultural Compatibility	Public Hygiene	Priority Weights
Workforce availability	1.00	5.00	5.00	7.00	0.596667
Community acceptability	0.20	1.00	3.00	5.00	0.229155
Cultural Compatibility	0.20	0.33	1.00	3.00	0.118823
Public Hygiene	0.14	0.20	0.33	1.00	0.055355
CI= 0.081467542, CR= 0.090519491, n=4					

Table 3.7: Pair-wise Comparison of the three sub-criteria with respect to Environmental Risk

	Waste Generation	Pollution	Climate Change	Priority Weights
Waste Generation	1.00	0.33	1.00	0.209708
Pollution	3.00	1.00	2.00	0.549619
Climate Change	1.00	0.50	1.00	0.240673
CI = 0.009620508, CR = 0.016587083				

Table 3.8: Pair-wise comparison of seven sub-criteria respect to Technological Risk

	Design and Constr-ucter	Multiple Functio-nality	Constructa-bility	Ame-ndm-ents	Facility Manage-ment	Accessi-bility and Evacua-tion	Durability	Priority Weights
Design and Constructer	1.00	3.00	1.00	3.00	5.00	5.00	7.00	0.296618
Multiple Functionality	0.33	1.00	5.00	3.00	3.00	5.00	7.00	0.263549
Constructability	1.00	0.20	1.00	3.00	3.00	3.00	5.00	0.17833
Amendments 0.33 0.33 0.33 1.00							3.00	3.00	5.00	0.114406
Facility Management	0.20	0.33	0.33	0.33	1.00	3.00	3.00	0.072253
Accessibility and Evacuation	0.20	0.20	0.33	0.33	0.33	1.00	3.00	0.048466
Durability	0.14	0.14	0.20	0.20	0.33	0.33	1.00	0.026379
CI = 0.129449743, CR= 0.098067987								

Table3.9: Pair-wise Comparison of seven sub-criteria with respect to Economic Risk

	Int. Rate	Prop. Type	Curr. Conv.	Dem.& Supp.	Mark. Liq.	Area Acc.	Inv. Return	Priority Weights
Interest Rate	1.00	3.00	3.00	5.00	5.00	7.00	9.00	0.370688
Property Type	0.33	1.00	5.00	3.00	3.00	5.00	7.00	0.24092
Currency Conversion	0.33	0.20	1.00	3.00	3.00	3.00	5.00	0.141509
Demand and Supply	0.20	0.33	0.33	1.00	3.00	3.00	5.00	0.105415
Market Liquidity	0.20	0.33	0.33	0.33	1.00	3.00	3.00	0.071117
Area Accessibility	0.14	0.20	0.33	0.33	0.33	1.00	3.00	0.045071
Investment Return	0.11	0.14	0.20	0.20	0.33	0.33	1.00	0.02528
CI = 0.107948613, **CR** = 0.081779252								

Table 3.10: Pair-wise Comparison of four sub-criteria with respect to Political Risk

	Political Group	Commercial Tax Policy	Council Approval	Licensing	Priority Weights
Political Group	1.00	5.00	5.00	7.00	0.608466
Commercial Tax Policy	0.20	1.00	3.00	3.00	0.203836
Council Approval	0.20	0.33	1.00	3.00	0.125265
Licensing	0.14	0.33	0.33	1.00	0.062434
CI= 0.078381765**, CR=** 0.08709085					

Calculation of the global weights

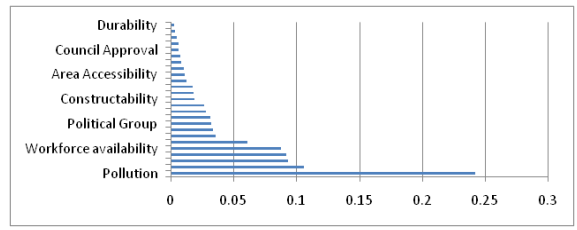
In this stage global weight of each criteria and sub-criteria has been calculated with respect to the goal of the study. For this purpose, local weights have been calculated with respect to the related hierarchy level. After that, the global weights have been calculated. The weight of the goal of the study is 1. The global weights have been calculated by using following formula:

Global weights = Σ (Local weight for criteria i x local weights for sub criteria j with respect to criteria i)

Table3.11: The local and global weights of the five criteria and twenty five sub-criteria

		Local Weights		Global Weights	
Hierarchy Level	Factor Categories/ Criteria and Corporate Sustainability Practices	Weights	Ranking	Weights	Ranking
Level 2	Pair-wise Comparison of the Three Factor Categories or Criteria with respect to the corporate sustainability performance				
	Social Risk	0.147102	3	0.147102	3
	Technological Risk	0.107502	4	0.107502	4
	Environment Risk	0.440398	1	0.440398	1
	Economic Risk	0.252311	2	0.252311	2
	Political Risk	0.052687	5	0.052687	5
	Sum	1			
Level 3	With Respect to Social Risk				
	Workforce availability	0.596667	1	0.087771	5
	Community acceptability	0.229155	2	0.033709	8
	Cultural Compatibility	0.118823	3	0.017479	15
	Public Hygiene	0.055355	4	0.008143	19
Level 3	With Respect to Technological Risk				
	Design and Constructer	0.296618	1	0.031887	10
	Multiple Functionality	0.263549	3	0.028332	11
	Constructability	0.17833	4	0.019171	13
	Amendments	0.114406	5	0.012299	16
	Facility Management	0.072253	6	0.007767	20
	Accessibility and Evacuation	0.048466	7	0.00521	23
	Durability	0.026379	2	0.002836	25
	With Respect to Environmental Risk				
	Waste Generation	0.209708	2	0.092355	4
	Pollution	0.549619	1	0.242051	1
	Climate Change	0.240673	3	0.105992	2
	With Respect to Economic Risk				
	Interest Rate	0.370688	1	0.093529	3
	Property Type	0.24092	2	0.060787	6
	Currency Conversion	0.141509	3	0.035704	7
	Demand and Supply	0.105415	4	0.026597	12
	Market Liquidity	0.071117	5	0.017944	14
	Area Accessibility	0.045071	6	0.011372	17
	Investment Return	0.02528	7	0.006378	22
	With Respect to Political Risk				
	Political Group	0.608466	1	0.032058	9
	Commercial Tax Policy	0.203836	2	0.01074	18
	Council Approval	0.125265	3	0.0066	21
	Licensing	0.062434	4	0.003289	24

Figure 1: Graphical Presentation



FINDINGS

By calculating global weights of each criteria and sub-criteria, the ranking of the various factors of risk management has become easier. Analytical hierarchical process is very useful in getting the solution of complex problems. One of the important features of AHP is that it is easy to modify to accommodate the particular problem in hand. In the present case AHP has adopted for the ranking of risk management factor in context to real estate sector. In the present study, risk management factors and sub-factors has been identified from literature. The hierarchical model, as shown in figure 4.1 is divided into the goal, criteria and sub-criteria. Next to this, pair wise comparison has been performed for the various criteria and sub-criteria. Afterwards, local and global weight for all criteria and sub-criteria was calculated. Environment risk with 44 % of total risk is almost 80 % more than the economic risk which is on second rank with 25 % weight followed by the social, technological and political risk. The sub-criteria pollution, climate change, interest rate have higher weights than all other remaining sub-criterion. Increasing concern for the pollution and recent changes in environmental and pollution related laws have made these factors important while developing any real estate. It is necessary to the practitioners to take care these factors to minimize the risk in the real estate development. These factors need to take care both in development and implementation phase.

Importance of above mentioned sub-criteria does not minimize the importance of the other factors. Each and every factor mentioned here can be a reason in increasing the risk in the real estate development. Managers need to focus on all these criteria to minimize the risk. The lower weight of these factors does not reduce their importance in the real estate sector.

CONCLUSION

Risk management is one of the important issues for real estate sector. It is necessary to take the steps towards the risk minimization. The main contribution of the present paper is to provide a risk management framework to the decision makers in the real estate sector. This paper has used the AHP methodology to rank the various risk management factors of real estate sector. In total twenty five practices were identified from the literature and expert survey. The ranking of these practices has been done by using AHP technique. It is one of important study for practitioners of real estate because it is based on the opinions of experts. Further studies may extend the use of AHP in other sectors.

REFERENCES

[1] Aaker, D.A. and Jacobson, R. (1987), "The role of risk in explaining differences in profitability, Academy of Management Journal, Vol. 30 No. 2, pp. 277-296. | [2] Agresti, A. (2007), An introduction to categorical data analysis, Wiley Series in Probability and Statistics. | [3] Byrne, P.J. (1996), Risk, uncertainty and decision-making in property development, 2nd ed, E. & FN Spon. | [4] Cadman, D. and Topping, R. (1995), Property development, 4th ed., Chapman & Hall. | [5] Deloach, J.W. (2000), "Enterprise-wide risk management: Strategies for linking risk and opportunity", Financial Times Management. | [6] Dickinson, G. (2001), "Enterprise risk management: Its origins and conceptual foundation", The Geneva Papers on Risk & Insurance, Vol. 26 No. 3, pp. 360-366. | [7] Ernst & Young AG (2002), "Embedded value and enterprise risk modeling", A White Paper for the American Council of Life Insurers. | [8] Federation of European Risk Management (2006), "Senior management now drives risk management", Press release, 11 October 2006. | [9] Gehner, E. and Dejonge, H. (2005), "A behavioral perspective on risk management in real estate development", in Y Wang & Q Shen (Eds.), Conference on construction & real estate management: challenge of innovation in construction and real estate, Vol. 2, pp. 739-744. | [10] Hewlett, C. and Kaufmann, G. (2008), Strategy for real estate companies, Urban Land Institute. |