Introduction

In this century, new industrial revolution is going on in a short while ¬ wide applications in electronics, medicine, pharmaceutical, consumer goods, etc. is found. Nanotechnology, the science of manipulating materials at the nanometer scale is 100-1. However, many new properties due to manipulation of atoms in scale, several questions such as manufacturing, consumer and environmental health and mind creates. If nano-engineered materials, different physical properties of the object such as its normal scale, newer risks to humans and the environment, it is possible that, in the manufacture, use and disposal have? With over ten years of first entry into the market for nano-products, pharmaceuticals, electronics industries have very little information aspects of its hazardous to the health, safety and environmental industries. Maybe when these products were produced for the market, few people understand the potential risks to human health and the environment, while studies on the biological response of nano-materials was found that the nano-particles generally break layers formed by reactive oxygen species on organisms - living is affected. It can also be through inhalation, ingestion, skin and enter the blood into humans. However, the toxicology of nano-materials research is still in its infancy, and no standard procedure for measuring the parameters of the tests. However, a lot of experiments on this subject has caused widespread concern. In recent years, as governments, NGOs and government agencies have called for industrial and non-industrial, nano-environmental health and safety issues to consider and to minimize the risk. Department for Environment Canada and other countries have done basic research to answer this question. What are the characteristics if there is a nanoparticle. It is possible for human health, the environment and risk to ecological receptors. We view this research as well as the environmental risks of nanotechnology research are a priority.

Multi-criteria is decision making in the field of operations research and management science. Over the last decade, according to the requirements of different applications were developed quickly. In the first study using paired comparisons matrix of the risk factors are weighted in nano-science. Each effect can be determined. Then the

TOPSIS method with different risk areas can be ranked in nano-science. Due to the mentioned features, increasing precision, calculation results in a fuzzy environment is presented. Necessary to explain the causes and risks of the various areas of study and the literature data mining techniques are identified. Whose details are given below.

Materials and Methods

Choice of method depends on the purpose and nature of research and its practical possibilities. So when we decided to research the subject and the nature and extent of objects are known. In many cases, a combination of methods is used. "Miller" believes that the orientation of the research project can be divided into three areas, which include Basic, Applied evaluating. This is the nature of the research. Researchers investigate the social implications or consequences of policy actions are common problems. Purpose of this research is to provide an accurate assessment of the social consequences of the program is applied to a social problem. The purpose of this research is applied and exploratory research - descriptive. In this regard, the data are in the analysis of literature. It is explained that this is part of a master's thesis. Way to identify areas of risk and risk factors that have been made in the data mining method. Then, in order to better analysis of the two questionnaires, the first questionnaire consisted of paired comparisons based nano-science and second questionnaire included the impact element is based on risk. The questionnaire asked the experts and scholars in the field of nano-science at least two basic elements examined in this study were familiar, has been prepared.

Finding and results

The outputs of scientific research in order to gather information that Iranian researchers in the field of nanotechnology is included within the years 2011-2000, the web site as the most comprehensive data available Scopus info has the to be as indexed in this site, including articles about the ISI, Iranian journal and conference following search terms were extracted.

A) In the title, abstract or keywords that contain the word Nano exist.

B) Address the article, Iran is inserted.

C) have been published within the years 2011-2000.

Information related to the research community, including title, abstract, keywords, Author and Keywords magazine was placed in an Excel file. To ease the work, all this information was merged into a string in a cell together. Feature makes it easier to search for information in the research community. In the next column, keyword research papers were placed in the designated areas.

A research paper is more than one field. For example in the field of nanotechnology are fullerenes. After sorting the articles on each of the eleven areas of nanoscience research, the same as the list of dangerous substances released by the Danish Environmental Protection Agency were used as keywords. Equation (1) specifies that if the hazardous substance is about 470 with the dangers that are created, is the articles used in the synthesis of nano-materials is or not. Hazardous material in the production process of each study was used as nano-materials risk research paper is intended.

Ranked first in terms of nano-science research areas of potential risk and using AHP, the researchers analyzed questionnaires. Row and column of the questionnaire comprised eleven nano-sciences. The areas of potential risk to human health and the environment are analyzed. Comparisons to fuzzy numbers and using numbers in Table 1 are filled. In the end, all the matrices, a matrix is equal. The geometric mean of all values and the resulting matrix is used for the calculations. The geometric means of each row of the fuzzy numbers have been calculated. Simple or non-fuzzy method to research each area is calculated using weight BNP.

$$BNP= [(U1-L1) + (M1-L1)] /3 +L1 \text{ (Sun et al, 2010)}$$

Tsble 1. Weight values are calculated by AHP method.

research areas	Weight of each field			Numerical weight	BNP	ranking
Nano-tubes	.045	.062	.076	.069	.066	9
Nano-crystalline	.054	.075	.105	.081	.078	7
Nano capsules	.053	.092	.128	.098	.094	4
Nanofibers	.100	.151	.215	.162	.155	2
Nanoparticles	.033	.198	.287	.215	.206	1
Nano-wires	.049	.069	.100	.076	.073	8
Nano-structures	.093	.139	.211	.155	.148	3
Nano-hole	.042	.061	.089	.067	.064	10
Other areas	.054	.076	.114	.084	.081	6
Fullerenes	.031	.049	.078	.056	.053	11
Mineral Nano-structures	.054	.078	. 113	.083	.082	5

As shown in the above table nano-particles most important variable in terms of environmental and human health risks are. It is explained that in order to ensure the consistency of comparison matrix were studied. Data matrix was formed eighth transformation matrix has the desired features. The values obtained using the matrix element specific maximum consistency index (CI) and consistency rate (CR) and the random index.

Note that the value is stable rate (CR) is less than 0.1. It can be stated that the compatibility matrix comparisons are appropriate. As shown in the table above.

Weights obtained by the eigenvector method to rank the research areas, but the weight is more accurate.

The weights obtained using the method of AHP, for each of the seven categories of risk research to hazardous substances are ranked. This is done by using fuzzy model. In the seven risk categories are created based on research risk. Thus was formed the first column of the matrix and the first row of the risk categories of nano-particles formed by eleven research. The details of the various categories of risk-risk research areas as fuzzy linguistic variables in Table 2 were scored. Then, using the normalized hourly data is normalized.

The positive ideal and negative ideal vectors are defined. In this study, the weight vector and the zero vector as the vector of positive ideal and negative ideal to consider. Because the coefficient vector of the normalized data in a lower value, and is definitely a smaller amount will be multiplied. After the distance matrix to form positive and negative ideal alternatives using it rated. It is explained that in order to calculate the distance to the ideal of a non-fuzzy method to calculate the distance to be calculated again using fuzzy distance.

The fuzzy method of calculating the data for each indicator using fuzzy distance have less than ideal. At the end of ten have achieved together is non-fuzzy. In computing the fuzzy parameters of fuzzy numbers have been less than ideal. Thus the ten positive and ten fuzzy ideal fuzzy negative ideal is achieved. Then, using fuzzy numbers are gathered together and the resulting number is non-fuzzy. The results showed that the relative distance between the ideal methods for different values of the alternatives presented. But their ranking fuzzy and non-fuzzy computational technique in both two and three for the rest of the field will show the same amount of risk.

Table 2. Non-fuzzy risk analysis method in class ranking table

CCj-	Impaired reproduction	Genetic changes	Carcinogenesis	Hazardous to the aquatic environment	Acute toxicity by ingestion	Skin rashes	Cause sensitization by skin contact
Amount	.6692	.5711	.7988	.7421	.7338	.6984	.7683
Rank	6	7	1	3	4	5	2

Table 3. Table class ranking fuzzy risk analysis method.

CCj-	Impaired reproduction	Genetic changes	Carcinogenesis	Hazardous to the aquatic environment	Acute toxicity by ingestion	Skin rashes	Cause sensitization by skin contact
Amount	.6685	.5784	.7717	.7616	.7298	.6934	.7471
Rank	6	7	1	2	4	5	3

In Table 3, the fuzzy distance calculation method is far from ideal. Ideal in Table 2 using the conventional method of discrete fuzzy numbers is calculated. As can be seen in the second and third level domains are different. The reason for this is that the fuzzy calculation method was more accurate calculations. There may be some small differences in the non-fuzzy approach unnoticed. The coefficients obtained for these two variables are closely associated. This is caused by the difference in rankings. But for other values of the ranking is similar. This shows that you can again be Non-fuzzy value can be attributable to its results.

Conclusions

There is a huge market potential for various areas of nanotechnology ¬ cause global Tmabl to invest in this technology are numerous. Large government agencies, corporate risk, corporations and governments as the main source of financing for the development of this technology are considered. In addition, because nanotechnology is an immature technology and spends the early stages of its growth, its behavior can not be predicted accurately. However, due to rapid growth and its impact on the welfare, safety, environment and performance can not be oblivious to its impact on society. This study is the first to try the effect of each type of hazardous material is determined by the level of environmental risk. Based on the method of paired comparisons Eleven factors were extracted from the data analyzed and calculated the weight of each of them. Then, using fuzzy TOPSIS ranking of risks posed by various research areas, that pose potential risk research, has been ranked. The results also show that this method is most likely the cause of the carcinogenic risks of nano-materials has seven fields. The skin is also sensitive to the risk to aquatic animals have the highest risk. Based on presentations by researchers and practitioners, to reduce the risks of nano-materials is sensitive areas of skin carcinogenesis and aquatic environment still too much attention. Accordingly, to reduce the risk of these areas have more weight on factors such as nano-materials, nano-fibers and nano-structures are organic, more focus. Control the effects of these substances can have a significant impact on human health and environmental risk is reduced.