Table 5. Factor loadings and component coefficients of interaction.

Item	Items	Factor loading	Component coefficient
1	There is lack of enough experience about solar water heater in city of Yazd.	0.701	0.416
2	There is no experience about construction management of solar water heater.	0.789	0.468
3	Lack of competitive markets to produce solar water heater in Yazd.	0.756	0.449

The values for factor loading items for culture, society, and politics are all acceptable except items no. 2 and 3 (Table 6), it can be concluded that people in Yazd do not have enough knowledge about advantageous and disadvantageous of solar water heater, but are ready to accept using solar water heater.

Table 6. Factor loadings and component coefficients of culture, society, and politics.

Item	Items	Factor loading	Component coefficient
1	People in Yazd do not have enough knowledge about advantageous and disadvantageous of solar water heater.	0.507	-0.394
2	People has more confidence in imported solar water heaters rather than Iranian productions.	0.298	0.231
3	There are various types of risks in Iran including investment risk for foreign investors in Iran	-0.0540	-0.419
4	People in Yazd ready to accept using solar water heater.	0.870	0.626

The values for factor loading items for financial risks are all more than 0.495, except construction risk with value of 0.192 (Table 7), it can be concluded that four items are suitable for these components, but construction risk is not suitable. Financial risks have five items which only two of them have component coefficient of less than 0.3 This shows that the impact of the items in the remaining components are relatively good.

Table 7. Factor loadings and component coefficients for financial risks.

Item	Items	Factor loading	Component coefficient
1	Inflation	0.495	0.316
2	Currency price	0.748	0.477
3	Interest rate	0.718	0.458
4	Price and budget risk	0.495	0.293
5	Constructional risk	0.192	0.123

The values for factor loading items for infrastructure risks are all more than 0.6 (Table 8), it can be concluded that three items are suitable for these components. Infrastructure risks have only three items which their component coefficients are almost 0.4645, 0.645, and 0.697 respectively which shows decrease of their effectiveness impacts respectively.

Table 8. Factor loadings and component coefficients of infrastructure risks.

Item	Items	Factor loading	Component coefficient
24	Risk difference between design and manufacturing	0.776	0.464
25	Health, Safety and Environment	0.694	0.645
26	Project submission	0.751	0.697

Table 9 shows that four items are suitable for these components. External risks component coefficients are not almost equal. It shows that regulations risks have more effects than others.

Table 9. Factor loadings and component coefficients of external risks.

Item	Items	Factor loading	Component coefficient
27	Economic situation	0.405	0.265
28	Regulations	0.842	0.551
29	Demanding risk	0.701	0.458
30	Political risk	0.405	0.265

Based on the factor analysis described in Tables 1 to 9, it was found that the factors affecting the use of SWH system in Yazd can be classified into 6 primary categories listed in Table 10.

Table 10. Factors affecting the use of SWH system in Yazd.

Components	**Factor**
Geographical location and environmental issues	Solar radiation.
	Preventing global climate change.
Economic issues	Attract private sector to invest.
	Economic benefits.
	Economic sanction.
Financial support	Allocation of Bank's loan.
	Governmental budget.
Science, technology and infrastructure	Enough knowledge, information and facilities to proper design.
	Necessary infrastructures
	Appropriation of Iran made Solar water heaters for industrial of solar energy.
	Appropriation of production of Solar water heater
Interactions	Lack of enough experience to produce Solar water heater.
	There is no experience about construction management of Solar water heater.
Cultural, social and political	People in Yazd has not enough knowledge about advantageous and disadvantageous of Solar water heater.
	People has more confidence in imported Solar water heaters rather than Iranian productions.
	People in Yazd ready to accept using Solar water heater.
	Political risks
	People in Yazd has not enough knowledge about advantageous and disadvantageous of Solar water heater.

Based on the factor analysis described in Tables 1 to 9, it was found that there are three main risks associating with SWH manufacturing in Yazd. The risks and factors are presented in Table 12.

Table 12. Final risks and factors related to SWH manufacturing in Yazd.

Risks	**Factors**
Financial risk	Inflation
	Currency price
	Interest rate
	Price and budget risk
Manufacturing risk	Risk difference between design and manufacturing
	Health, Safety and Environment
	Project submission
External risk	Economic situation
	Regulations
	Demanding risk
	Political risk

4. Conclusion

The goal of this study was to identify and prioritize the factors affecting the use of solar water heaters in Yazd using the factor analysis methodology. This is the first study that uses factor analysis for investigating the factors affecting the use of solar water heaters; so its results can contribute to the progress and success of programs associated with further use of solar water heating systems. The factors affecting the design, construction and operation of solar water heaters and the risks that may undermine this process were identified by preliminary studies on solar energy and then solar water heaters, their components, functions of each component, and different types of these heaters. The most important results of this study are as follows:

- In areas where there is a great potential for exploitation of solar energy, the people's tendency toward the efficient use of solar energy and solar-based techniques and appliances increases with their awareness about available solar options and applications.
- Finally, 74.62% of the participants expressed a positive view on the prospect of using solar water heaters in Yazd. The risks associated with the implementation of such project can be divided into three major categories: financial risks, construction risks, and external risks.
- Classification of factors affecting implementation of solar water heater in Yazd indicates that there are six components which can be considered like: Geographic location and environmental issues; economic problems; financial support; infrastructures, technology, and knowledge; interaction; culture, society, and politics.
- There are three main risks in implementing solar water heaters which can be divided into the following three categories: internal; external; and manufacturing risks.
- Based on the results and the model obtained in this study, all factors affecting the design, construction, and implementation of solar water heating systems in Yazd were identified and prioritized. According to the results, to develop and promote the use of solar water heating systems in Yazd, government should focus on the economic issues, financial support, and infrastructure associated with this effort. Boosting the level of local engineering knowledge and technology related to manufacture and maintenance of solar water heaters and promoting the design and manufacturing techniques required for such efforts will allow the solar-based systems to be utilized with greater efficiency.

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