

An Expert System to Determine the Probability of Success and Readiness in Entrepreneurship

Ruqaya Al-Lamki, Marwah Al-Sumri, Sharifah Al-Ismaili and Kamla Ali Al-Busaidi

Department of Information Systems, Sultan Qaboos University
P.O. Box: 20, PC: 123, AlKhod, Muscat, And Sultanate of Oman
[101033, 103544, 100841] @student.squ.edu.om, kamlaa@squ.edu.om

Abstract: *Entrepreneurship means different things to different people, but entrepreneurship has become one of the most important ways to succeed in today's competitive business environment. This study assesses an entrepreneur's readiness and probability of success using an expert system. Specifically, entrepreneurs can assess themselves by responding to fifty statements, categorized into ten different skills. These fifty statements were developed by a human expert in the entrepreneurship domain. Thus, this study assessed the development of this proposed expert system through a questionnaire evaluation of users and experts who tested the system.*

Keywords: *Entrepreneurship, Expert System, Entrepreneurs, Knowledge and field of entrepreneurship.*

Received: May 01, 2016 | *Revised:* August 10, 2016 | *Accepted:* August 25, 2016

1. Introduction

Peter Drucker said, "Entrepreneurism is neither a science nor an art. It is a practice." According to [2] entrepreneurship is "the ability to create and build something from practically nothing. It is initiating, doing, achieving and building an enterprise or organization, rather than just watching, analyzing or describing one." In other words, entrepreneurship is about discovering new profitable opportunities that make a change in society. It consists of individuals using limited resources and processing them to create an innovative [12]. Entrepreneurs are recognized according to the kind of products they create, the processes they use, and the services they deliver to the marketplace [7]. Before starting a new business, good entrepreneurs perform a self-analysis of their strengths and weaknesses. They need to be honest and have a clear understanding of their personal behavior.

According to [15], entrepreneurship readiness is defined as the set of personal features that differentiate individuals with readiness for entrepreneurship by adopting their capacities to monitor and examine the environment for the aim of self-achievements. Therefore, individuals must understand their personal traits and measure their entrepreneurship readiness before starting a new business. Individuals differ in their entrepreneurial behavior such as opportunity

recognition, innovation, and value creation [10]. Therefore, this field is risky for those who lack these behaviors.

Mostly, starting a business is considered an individual decision and the qualities of that individual immediately affect the future of the business [11]. Entrepreneurs who are emotionally stable are more likely to find success. In addition, they are more likely to expand their business [1]. The desire to resolve mistakes, the ability to take risk, and seeking feedback are the main defined traits for entrepreneurs [6]. Combining these traits will result in success for the entrepreneur. Furthermore, writing a suitable business plan can strongly assess the future success of a business [3]. Understanding and staying up to date with the market and environment changes such as economic and technology changes, and the ability to positively deal with these new challenges is essential for successful entrepreneurs [8]. Entrepreneurs should have the ability to interact with these institutional characteristics to determine the success and growth of the business [19]. Entrepreneurs are more important in some countries than others. Studies have proven that there is a correlation between economic freedom and democratic development of the country and the level of cognitive skills of individuals [5].

Artificial intelligence (AI) technologies are increasingly being used for knowledge acquisition processes. These systems are developed for the purpose of improving the understanding of human thought [2]. The major challenge of AI is providing the probability of confidence for a particular decision, especially if it is related to statistics [18].

An entrepreneurship expert system supports individuals in assessing their entrepreneurship skills before starting a business. This can be done through a system that includes a set of if-then rules, which passes the user to the final conclusion according to the user's inputs [9]. It saves time and effort for both the individual and the knowledge expert, rather than going all the way to a knowledge expert for assessment.

Eliciting tacit knowledge from explicit knowledge is considered the main bottleneck in the development phase of knowledge-based systems [14]. An expert system, like any other system, faces several challenges during development. It is very difficult to find a domain expert that is free and ready to share his knowledge. Sometimes misinterpretations exist between the knowledge engineer and the domain expert. These issues can negatively affect the system's efficiency and lead to logical errors in the system. Research studies have proven that a well-trained entrepreneur has more management skills than untrained entrepreneurs to successfully run their own business [14].

Nowadays, Oman is facing economic challenges that have affected many different sectors. There is no balance between the demand for workers and the available job offers and opportunities. To solve the problem of such high unemployment, job seekers should think about creating jobs rather than seeking for jobs. Before starting a business, however, potential entrepreneurs should invest in developing their potential skills and habits to avoid any future failure. This type of investment will improve the economic situation in the country.

There are currently no free online expert systems to assess the readiness of people to become entrepreneurs. However, there are different accredited centers around the world that conduct tests for participants to get earn an International License for Entrepreneurship (ILFEN). Those who do not have an accredited center nearby can take the test online.

Consequently, the objective of this study was to develop an expert system to determine the probability of success in entrepreneurship. The objective of the system was to assess the user's suitability to be self-employed and start a business. It also assesses the entrepreneurial spirit from different viewpoints. The first goal of the system is to measure the percentage of readiness the user has to start any business. Then, a description is provided by the system depending on the

user's readiness. This description includes advice about how users can improve their personality. It also shows the skills that users need to learn to successfully initiate and manage potential entrepreneurial projects.

2. System Development

2.1 Knowledge Elicitation Process

Maintaining up-to-date knowledge affects the effectiveness and efficiency of decision making and future problem-solving [4]. There are a variety of methods used in knowledge elicitation. The entire operation of the expert system depends on the accuracy of the elicited knowledge. In the early stages of knowledge elicitation, it is better to follow the unstructured interview through which the elicitor tries to get information about the domain expert and the knowledge that expert has. The ideal method to be applied here is an interview.

The knowledge for this developed system was acquired from Mr. Ishaq Al-Sheriani, who has several certificates in the areas of entrepreneurship and preparing feasibility studies. The Ambition Center he established, still under construction, specializes in the training and rehabilitation of entrepreneurs and in the preparation of feasibility studies. The center provides consultancy and support to those who want to start their own business to move forward and overcome any expected challenges. The center aims to provide feasibility studies by creating a new method using the latest methods to achieve the greatest possible efficiency and knowledge in the shortest time. It also provides services and programs devoted to the establishment and development of Omani businesses to provide added value to the national economy. Mr. Ishaq was the first Omani to earn the ILFEN. Therefore, Mr. Ishaq was selected as the knowledge domain expert and the source of knowledge for the development of this proposed system. Oman currently has a high rate of unemployment because of the lack in jobs. The Ambition Center encourages young people to start their own business projects and provides opportunities to develop their projects. Specifically, the center provides consultation, technical support, and advice.

The knowledge elicitation process was conducted over several rounds of interviews with Mr. Ishaq, an Omani expert in the field of entrepreneurship. The interview is the most popular method for knowledge elicitation, but the domain expert also provided information to be integrated in the system.

2.2 System Analysis and Design

2.2.1 Inputs

The system examined user responses to determine their probability of success in entrepreneurship based on 50 statements in ten different characteristics. Each characteristic contains five different statements

(questions). Figure 1 illustrates the main screen of the system.



Figure 1: Main Screen of the developed system

The following entrepreneurial characteristics were tested:

- Leadership
- Planning
- Taking risks
- Self-confidence
- Avoiding fear of failure
- Creative thinking ability
- Perseverance
- Making decisions
- Exploiting opportunities
- Communication and organization

The following examples demonstrate five statements to assess leadership, taking risks, and exploiting opportunities:

- Leadership:
 1. Success is very important to me.
 2. When I set a goal, I would love to see it happen.
 3. I'm confident.
 4. I do not like to be guided in what I should do.
 5. I am an intrepid person.
- Taking risks:
 1. I always see the cup as half full rather than half empty.
 2. I do not get tired when I am interested in a project.
 3. I am an adventurer.
 4. Others say that am stubborn.
 5. I like to decide my own work hours and conditions.
- Exploiting opportunities:
 1. I initiate participation in different activities.

2. I like to benefit from previous mistakes as lessons I should learn.
3. I like to let my friends know and read about my social activities.
4. I love reading books.
5. I love attending social events.

All questions were Forced Choice type questions. In other words, the user could only select one choice:

1. Yes
2. Probably
3. No

The following examples illustrate prompts in the eXpertise2Go expert system shell software (Figure 2):

PROMPT [Question1] Forcedchoice
 "1. Success is very important for me."
 "Yes"
 "Probably"
 "No"

PROMPT [Question2] Forcedchoice
 "2. When I put a goal I would love to see it happen."
 "Yes"
 "Probably"
 "No"

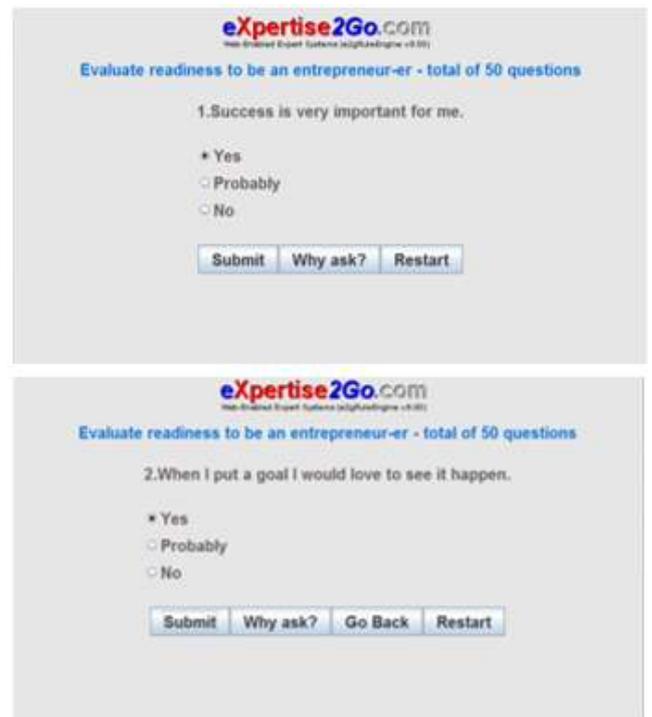


Figure 2: A Sample of Prompt Questions

2.2.2 Outputs

The developed system provides twelve outputs: a measure out of ten for each skill, total percentage of readiness, and description of readiness. The system will count number of recommended answers. Since the system asked a total of 50 questions, each answer was worth 2%. Therefore, the lowest readiness score that users can attain is 0% and the highest is 100%.

Each skill was measured out of ten, and it was considered an intermediate goal to count the total percentage of readiness. The readiness percentage is an intermediate goal for the description of readiness provided by the knowledge expert. All of these goals are presented to users after they answer all the questions.

The final goal is a description of the user readiness depending on the final percentage as follows:

1. If the readiness percentage was between 81% and 100%, then the description of readiness was: "Congratulations, you have a strong capacity for self-employment and starting your own business. You have the characteristics of entrepreneurship and innovation. So go ahead. What you need now is knowledge and application to follow the path of self-employment."
2. If the readiness percentage was between 61% and 80%, then the description of readiness was: "Well done, you have the ability to start your own business and self-employment, but you need to improve your skills and refine them in vulnerable areas through training and rehabilitation. You are close to the required characteristics and you have to work hard to reach the required limit."
3. If the readiness percentage was between 41% and 60%, then the description of readiness was: "Good work, you may be eligible to start your own business. You may need a partner that can replenish and work as a team. This might be the most successful way to fight in self-employment."
4. If the readiness percentage was between 21% and 40%, then the description of readiness was: "Self-employment may not be the best option. You may be happier and successful if you worked with someone else to gain sufficient experience and confidence to start you own business."
5. If the readiness percentage was between 0% and 20%, then the description of readiness was: "Unfortunately, you do not have the capacity for self-employment and starting your own business."

2.2.3 Reasoning Logic

The output of the expert system differed from one user to another; each user answered the questions differently depending on their personality. Since the system examined the user with a total of 50 statements covering 10 skills, the system assigned a score for the selected answer to each statement. Each statement had a recommended answer (either yes, probably, or no).

The following code (in eXpertise2GO expert system shell) indicates that the recommended answer for the first leadership statement is "Yes", while the recommended answer for the second leadership question is "No". Users get a score of 0.2 if their answer matches for each question; otherwise they receive a score of 0.

```
Rule [percentage of Leadership Q1]
IF [Question1] = "Yes"
THEN [Leadership1] = 0.2
ELSE [Leadership1] = 0
```

```
Rule [percentage of Leadership Q2]
IF [Question2] = "No"
THEN [Leadership2] = 0.2
ELSE [Leadership2] = 0
```

The following code sums the leadership skill percentage after the user answers the five leadership questions (Note: "?" operator means determined):

```
Rule [percentage of Leadership Skill]
IF [Leadership1] ? and
[Leadership2] ? and
[Leadership3] ? and
[Leadership4] ? and
[Leadership5] ?
THEN [Leadership out of 10]=
{([Leadership1]+[Leadership2]+[Leadership3]+[Leadership4]+[Leadership5])*10}
```

After the system measured each skill out of ten, it calculated the readiness percentage for starting a business or becoming an entrepreneur. The total percentage was calculated by adding the measure of each skill as indicated in the following code:

```
Rule [percentage of SKILLS]
IF [Communication and organization out of 10] ? and
[Exploit opportunities out of 10] ? and
[Making decisions out of 10] ? and
[Perseverance out of 10] ? and
[Creative thinking ability out of 10] ? and
[Avoid Fear of failure out of 10] ? and
[Self-confidence out of 10] ? and
[Taking risk out of 10] ? and
[Planning out of 10] ? and
[Leadership out of 10] ?
THEN [percentage out of 100] = {[Leadership out of 10] + [Planning out of 10] + [Taking risk out of 10] + [Self-confidence out of 10] + [Avoid Fear of failure out of 10] + [Creative thinking ability out of 10] + [Perseverance out of 10] + [Making decisions out of 10] + [Exploit opportunities out of 10] + [Communication and organization out of 10]} and
[more information] = "How to improve your entrepreneurship skills"
```

Later, the system provided a description of the user's readiness to start a business (Figure 3). As previously mentioned, this description depends on the total percentage. Therefore, the percentage is an intermediate goal. The following code illustrate two examples of an entrepreneurship readiness description conclusion based on the total skills percentage:

```
Rule [ percentage of readiness is between 81%
_100% ]
IF [percentage] > 80 and
[percentage] <= 100
```

THEN [description] = "You have a strong capacity for self-employment and to start your own business. You have the characteristics of entrepreneurship and innovation. So go ahead. What you need now is knowledge and application to follow the path of self-employment"

Rule [percentage of readiness is between 0% _20%]
 IF [percentage] >= 0 and [percentage] <= 20
 THEN [description] = "You do not have a capacity for self-employment and to start your own business"



Figure 3: The developed system Conclusion

For example, if a user assessed his entrepreneurship skill by selecting at least 41 of recommended answers, than the system will report an 82% readiness score and a description indicating that the user is strongly ready to start a business.

A decision table describing how the logic of the system works was used to simplify the reasoning process for the development of this study system. Table 1 is a simple example of a decision table that illustrates the process of the system from input to output:

Table 1. A Sample of Reasoning Logic Decision Table

Q1	Yes	No	Yes
Q2	No	Probably	No
Q3	Probably	Yes	Probably
Q4	Yes	Yes	Yes
Q5	Yes	No	Yes
Q6	Yes	No	Yes
Q7	Yes	Yes	No
Q8	Yes	No	Yes
Q9	Yes	Yes	Yes
Q10	Yes	No	Probably
Q11	Yes	Probably	Yes
Q12	Yes	Probably	Yes
Q13	Yes	Probably	No
Q14	Yes	No	No
Q15	Yes	Probably	Yes
Q16	Yes	Yes	Yes
Q17	Yes	No	Yes
Q18	Yes	No	Yes
Q19	Yes	No	Yes
Q20	Yes	Probably	Probably
Q21	Yes	No	Probably

Q22	Yes	No	Yes
Q23	Yes	Probably	Yes
Q24	Yes	Probably	Yes
Q25	Yes	No	Yes
Q26	Yes	Probably	Yes
Q27	Yes	Probably	Yes
Q28	Probably	Probably	Probably
Q29	Yes	Yes	Yes
Q30	Yes	Probably	Yes
Q31	Yes	Probably	Yes
Q32	Yes	No	Yes
Q33	Yes	Probably	No
Q34	Yes	No	Probably
Q35	Yes	Probably	No
Q36	Yes	No	Yes
Q37	Yes	Probably	Yes
Q38	Yes	No	Yes
Q39	Yes	No	Probably
Q40	Yes	Yes	Yes
Q41	Yes	No	No
Q42	Yes	Yes	Yes
Q43	Probably	Yes	Probably
Q44	Yes	Yes	Yes
Q45	Yes	No	No
Q46	Probably	No	Probably
Q47	Yes	No	Probably
Q48	Yes	No	Yes
Q49	Yes	No	Yes
Q50	Yes	No	No
	[Leadership] is: 8 [Planning] is: 10 [Taking risk] is: 10 [Self-confidence] is: 10 [Avoid Fear of failure] is: 10 [Creative thinking ability] is: 8 [Perseverance] is: 10 [Making decisions] is: 10 [Exploit opportunities] is: 8 [Communication and organization] is: 8 [Percentage] is: 92% [Description] is: You have a strong capacity for self-employment and to start your own business. You have the characteristics of entrepreneurship and innovation. So	[Leadership] is: 0 [Planning] is: 4 [Taking risk] is: 0 [Self-confidence] is: 2 [Avoid Fear of failure] is: 0 [Creative thinking ability] is: 2 [Perseverance] is: 0 [Making decisions] is: 0 [Exploit opportunities] is: 6 [Communication and organization] is: 0 [Percentage] is: 14% [Description] is: You do not have a capacity for self-employment and to start your own business.	[Leadership] is: 4 [Planning] is: 6 [Taking risk] is: 6 [Self-confidence] is: 8 [Avoid Fear of failure] is: 8 [Creative thinking ability] is: 8 [Perseverance] is: 4 [Making decisions] is: 8 [Exploit opportunities] is: 4 [Communication and organization] is: 4 [Percentage] is: 58% [Description] is: You may be eligible to start your own business. You may need a partner that can replenish and work as

	go ahead. What you need now is knowledge and application to follow the path of self-employment.		a team. This might be the most successful way to fight in self-employment
--	---	--	---

3. System Implementation Evaluation

3.1 Evaluation Method

The system was tested by a total of fifteen users, including the domain expert, at different stages and positions. Their feedback was then gathered through a survey given immediately after testing for the aim of assessing the benefits and limitations of the system. The survey gathered users' opinion about the system on three areas: input indicators, output indicators, and overall system indicators, based on a five point Likert scale. Around 53.3% of the survey participants were male and 46.7% were female. Twelve participants were students, two of participants were employees, and one was an entrepreneur who is the owner of The Ambition Center. Thirteen participants had a B.Sc. degree, one participant had a diploma, and one participant had a PhD.

3.2 User Evaluation

Starting with the rating questions, the survey asked the user to answer questions related to the quality of the system inputs. Around 73.3% of participants strongly agreed that the system's questions were relevant, while 13.3% agreed and 13.3% were neutral. Around 40% of participants strongly agreed and 60% agreed that the asked questions were accurate. About 40% strongly agreed that the questions were complete, while 40% agreed, 13.3% were neutral, and 6.7% disagreed. About 53.3% strongly agreed and 46.7% agreed that the questions were clear. Finally, 73.3% strongly agreed that the questions were relevant. These results indicated that most participants were satisfied with the system inputs, but that there is a need to improve the accuracy and completion of the system's questions.

Next, the survey asked the user to assess the quality of the system outputs. First, around 53.3% strongly agreed that the conclusion was accurate, while 40% agreed, and 6.7% were neutral. About 40% strongly agreed that the conclusion was complete, while 53.3% agreed and 6.7% were neutral. About 46.7% strongly agreed that the conclusion was consistent, while 46.7% agreed, and 6.7% were neutral. About 66.7% strongly agreed that the conclusion was clear, while 26.7% agreed, and 6.7% were neutral. Finally, 40% strongly agreed that they trusted the output of the system, while 46.7% agreed, and 13.3% were neutral. These results demonstrate that most of the participants had a positive attitude about the quality of the system's output.

The survey included other questions related to the overall system quality. First, 33.3% strongly agreed

that the system was reliable, while 53.3% agreed, 6.7% were neutral, and 6.7% disagreed. Second, 66.7% strongly agreed that the system was easy to use and 33.3% agreed. Third, 73.3% strongly agreed that the system had a good response speed and 26.7% agreed. Fourth, 66.7% strongly agreed that they were satisfied with the developed expert system, while 26.7% agreed, and 6.7% were neutral. Fifth, 80% strongly agreed that the system was useful, while 13.3% agreed, and 6.7% were neutral. Sixth, 53.3% strongly agreed that they would use the system if they had access to it, while 40% agreed and 6.7% were neutral. Seventh, 53.3% strongly agreed that they trust the developed system, while 33.3% agreed, and 13.3% were neutral. Finally, 86.7% strongly agreed that the system improved their awareness about the topic and 13.3% agreed. The results indicate that most participants were satisfied with the overall system quality.

In addition, the survey included open-ended questions about the benefits and limitations of the developed expert system. The majority of users said that the system was beneficial because it saved time and costs; produced an accurate result; and improved their awareness about entrepreneurship assessment. On the other hand, the developed expert system is still limited; it must be more detailed, with an expansion of the conclusion and additional factors such as age and environment rather than personality.

Mr. Ishaq Al-Sheriani, the domain expert of this study, is an Omani entrepreneur from the education sector who was also involved in the testing. He has been involved in initiating private firms for over twenty years, starting with the establishment of a private school. Currently, he owns an education consultancy firm called "Tatweer". After using the system, Al-Sheriani stated that he found the system to be useful and comprehensive. He also asserted that he found the system to be user-friendly. He expressed his interest in the system as it helped him to look back at what he has been doing and encouraged him to make improvements on his work. Although he said that some of the statements were not very important or essential, they did not cause any inconvenience to him. Yet, he suggested trying to make it shorter as this would encourage people to use it. He also found the conclusion interesting as he was thinking of it from the perspective of an external review. He seemed to have enjoyed the idea and encouraged its further development.

Another entrepreneur who has a full time job while also managing a private business from home for the last 15 years also tested the system. He depends mainly on social media, especially Instagram, to market his services in Oman and the gulf countries. His virtual company, Al Badr Printing, prints on CDs and other items. His business becomes very popular during holidays and other celebrations as there is a lot

of demand for his services on those occasions. After testing the system, he said that he was happy to participate because it offered him a chance to look at his own business in a different way.

4. Recommendation

Entrepreneurship is the process of creating something new, different, or unique that adds value to the society [7]. This study presented the development of an expert system to assess the probability of success and readiness in entrepreneurship, based on personal traits. The study also indicated, based on the evaluation of 15 users, that the system adds value and provides good quality in terms of inputs, outputs, and overall system quality.

Different dimensions must be considered when evaluating an individual's readiness for entrepreneurship. This system only tested personal traits, but environmental conditions also have an effect on the decision to start a business [16]. This is often related to the economic and political situation that surrounds the individual, as well as to the type of business. Another measurement of entrepreneurship readiness is the person's age and gender. One important factor is whether the individual can offer the needed capital for the business. Indeed, many other measurements can be included in this system. It is good to combine all these measurements into a single system, but it is hard to find a suitable knowledge expert with enough knowledge of different aspects of entrepreneurship readiness and the ability to share that knowledge.

Furthermore, many researchers have found that entrepreneurship training can improve the management skills of entrepreneurs. The entrepreneur's management, leadership, and planning skills affect the decision-making and the success of the company, and can help ensure its sustainability. Through this system, users can hopefully: (1) assess and develop their entrepreneurial skill, which is the major goal of this work; (2) understand the management skills required for an entrepreneur and learn how to achieve it; (3) evaluate the risk-taking and locus of control for an entrepreneur and provide an appropriate plan; and (4) develop their critical and creative thinking skills [13].

References

- [1] H. Brandstätter, Becoming an entrepreneur—a question of personality structure? *Journal of economic psychology*, vol. 18, no. 2, pp. 157-177, 1997.
- [2] P. R., Cohen, and E. A. Feigenbaum, *The handbook of artificial intelligence*, vol. 3. Butterworth-Heinemann. 2014.
- [3] M. P., Driessen, and P. S. Zwart, The role of the entrepreneur in small business success: the Entrepreneurship Scan. In *44th ICSB World Conference Proceedings Innovation and Economic Development: the Role of Entrepreneurship and SMEs*. Nápoles, June 1999, pp. 20-23.
- [4] J. S., Edwards, T., Alifantis, R., Hurion, J., Ladbrook, S., Robinson, and A. Waller, Using a simulation model for knowledge elicitation and knowledge management. *Simulation Modelling Practice and Theory*, 12(7), pp. 527-540, 2004.
- [5] R. W., Hafer, and G. Jones, Are entrepreneurship and cognitive skills related? Some international evidence. *Small Business Economics*, vol. 44, no. 2, pp. 283-298, 2015.
- [6] A., Ibrahim, and K. Soufani, Entrepreneurship education and training in Canada: a critical assessment. *Education+ training*, vol. 44, no. 8/9, pp. 421-430, 2002.
- [7] R. W. Kao, Defining entrepreneurship: past, present and? *Creativity and Innovation Management*, vol. 2, no. 1, pp. 69-70, 1993.
- [8] E., Kyndt, and H. Baert, Entrepreneurial competencies: Assessment and predictive value for entrepreneurship. *Journal of Vocational Behavior*, vol. 90, pp. 13-25, 2015.
- [9] K. C., Laudon, and J. P. Laudon, Management information systems: managing the digital firm. *New Jersey*, 8, 2004.
- [10] F., Leutner, G., Ahmetoglu, R., Akhtar, and T. Chamorro-Premuzic, The relationship between the entrepreneurial personality and the Big Five personality traits. *Personality and individual differences*, vol. 63, pp. 58-63, 2014.
- [11] H. Littunen, Entrepreneurship and the characteristics of the entrepreneurial personality. *International Journal of Entrepreneurial Behavior & Research*, vol. 6, no. 6, pp. 295-310, 2000.
- [12] J. Nga, H. K., and G. Shamuganathan, The influence of personality traits and demographic factors on social entrepreneurship start up intentions. *Journal of Business Ethics*, vol. 95, no. 2, pp. 259-282, 2010.
- [13] S. S. Putta, Improving Entrepreneur's Management Skills through Entrepreneurship Training. *Journal of Commerce and Management Thought*, vol. 5, no. 3, pp. 459, 2014.

- [14] S., Robinson, E. P., Lee, and J. S. Edwards, Simulation based knowledge elicitation: Effect of visual representation and model parameters. *Expert systems with applications*, vol. 39, no. 9, pp. 8479-8489, 2012.
- [15] J., Ruiz, D. R., Soriano, and A. Coduras, Challenges in measuring readiness for entrepreneurship. *Management Decision*, vol. 54, no. 5, 2016.
- [16] R. S., Schillo, A., Persaud, and M. Jin, Entrepreneurial readiness in the context of national systems of entrepreneurship. *Small Business Economics*, vol. 46, no. 4, pp. 619-637, 2016.
- [17] E. Schmitt-Rodermund, Pathways to successful entrepreneurship: Parenting, personality, early entrepreneurial competence, and interests. *Journal of Vocational Behavior*, vol. 65, no. 3, pp. 498-518, 2004.
- [18] G. Shafer, Probability judgment in artificial intelligence and expert systems. *Statistical science*, pp. 3-16, 1987.
- [19] S., Terjesen, J., Hessels, and D. Li, Comparative International Entrepreneurship A Review and Research Agenda. *Journal of Management*, vol. 42, no. 1, pp. 299-344, 2016.
- [20] J. A., Timmons, and S. Spinelli, New venture creation: Entrepreneurship for the 21st century (Vol. 4): Irwin Burr Ridge, IL., 1994.

management information systems from Claremont Graduate University in California. Her research interests include knowledge management systems, knowledge economy, learning management systems and the deployment of information and communication technologies in Arab countries.



Ruqaya Al-Lamki is a student at the information systems department at Sultan Qaboos University. Her research interest includes expert system, knowledge management and CRM.

Marwah Al-Sumri is a student at the information systems department at Sultan Qaboos University. Her research interest includes expert system and knowledge management.

Sharifah Al-Ismaili is a student at the information systems department at Sultan Qaboos University. Her research interest includes knowledge-based systems and application development.



Kamla Ali Al-Busaidi is an Associate Professor of information systems at Sultan Qaboos University in Oman. She received her PhD in