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Article

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What motivates academics to engage in industry? The role of spiritual and religious urges

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ABSTRACT

This study introduces and applies the Fitrah Tendencies framework to make up for the dearth of studies on academics' urges to play a part in industry. To this end, 62 academics were selected and interviewed based on Lam's (2011) typology as to come up with their main motives for engaging in industry. As per the results, new dimensions including the need for fully understanding God, the desire for doing good deeds, and the freedom felt in the economic environment were added to the previously reported factors.

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1. Introduction

Scholars' recently developed social role has urged many universities worldwide to boost their income through establishing links between their intellectual properties and industry (Henkel, 2005). The emerging scientists have challenged Merton's (1957) early formulation of the norms of basic science and the newly proposed productive interactions (Spaapen & Van Drooge, 2011), social impacts of research (Bornmann, 2013), scientific research and innovations (Owen, Macnaghten, & Stilgoe, 2012), and transformative changes (Schot & Steinmueller, 2016).

To know of scientists' interest in engaging in industry and entrepreneurial activities (Rothaermel, Agung, & Jiang, 2007), scholars have explored such factors as the academics' human capital endowments and social networks (Audretsch, Aldridge, & Sanders, 2011) and financial and reputational benefits of private businesses (Lacetera, 2009). However, the reported results are not conclusive as less attention has been paid to spiritual and religious urges (Balog, Baker, & Walker, 2014). Thus, integrating different motivational urges of academic entrepreneurs and using

an Islam-oriented conceptual framework under the name of Fitrah Tendencies is the objective here.

2. Research context

No thorough exploration of motivational factors in stimulating academics to engage in industry has been done (Guerrero & Urbano, 2012), nor of the Iranian universities (Farsi, Modarresi, Motavaseli, & Salamzadeh, 2014) which call for knowledge about the academics' motivational drives before developing any incentive policies to connect universities with industries (Jain, George, & Maltarich, 2009; Lockett & Wright, 2005; Shane, 2004).

As a developing country, Iran has experienced several institutional evolutions in science, technology and innovation (STI) of its governance system since 2000. The Iranian STI policy makers seemingly hold that transition to entrepreneurial universities is necessary to solve many social problems; e.g., they changed the Ministry of Culture and Higher Education (MCHE) to Ministry of Science, Research & Technology (MSRT) to establish *entrepreneurship centers* at universities. Four years later, the law on the 4th Five-Year Economic, Social and Cultural Development Plan (FYESCDP) of the state was passed to the effect of universities' modifying their curricula and providing entrepreneurship education and opportunities for research. To this end, the Iranian Supreme Council for Science, Research & Technology (ISCSRT) was set up as a division of MSRT in 2004. Next, the Vice-Presidency for Science and Technology (VPST) was built in 2006 to facilitate commercialization

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of science. The successive 5th FYESCDP was to develop Academic Entrepreneurship Development Plan (AEDP) to be implemented in 2009. Coincidentally, a new law was enacted to support commercialization of academic inventions, and implemented in 2012. Other important policies include establishing the commission for teaching and research in the parliament, creating offices to link university and industry, building offices, research centers, science and technology parks, business incubators, and venture capitals for transferring technology (TTO).

Despite the already made institutional provisions such as passing laws and building new organizations, national (Farsi, Imanipour, & Salamzadeh, 2012) and international (RezaeiZadeh, Hogan, O'Reilly, Cunningham, & Murphy, 2017) studies have shown how the goals of policy makers have not been fully achieved and the transition to entrepreneurial university not successfully happened. This may be because institutional provisions are not the only prerequisites for establishing the link between university and industry, rather, there exist a number of environmental and internal factors that affect the development of entrepreneurial universities (Fini, Grimaldi, & Sobrero, 2009; Guerrero & Urbano, 2012). The former incorporates issues such as focus on the Iranian developmental plans and building TTOs and business incubators; whereas, the internal factors have to do with issues such as the personality traits of the managers and academics, sources of funding, and strategies for making effective incentives (Guerrero & Urbano, 2012).

The previous studies (Franco & Haase, 2015; Louis, Blumenthal, Gluck, & Stoto, 1989) marked the heterogeneity of the academics who were led by different motivational drives to engage in industry. For example, in her typology (Table 1), Lam (2010) incorporates a comprehensive categorization of entrepreneurs. At one end of the spectrum, “traditional” academics believe in distinction between academia and industry, while at the other, “entrepreneurial” academics highlight the fundamental importance of science-business collaborations. In between, there exist “traditional hybrid” and “entrepreneurial hybrid” academic people who are mainly identified based on their tendencies towards the aforementioned ends of the continuum. Thus, the traditional academics are not expected to be interested in industry (Campbell & Slaughter, 1999). However, some evidence indicates that they can assist in solving economic problems (Etzkowitz, 2014).

Given the gap in the available literature and the reality of the Iranian academic context where young researchers are supported to participate in entrepreneurship activities, the question of why academics engage in industry deserves particular attention. To maximize the impact of our inquiry, we narrowed down its scope and developed questions that solely revolved around teacher-researchers as opposed to lecturers. The questions included which motivational factors encourage 1) *traditional*, 2) *traditional hybrid*, 3) *entrepreneurial hybrid*, and 4) *entrepreneurial* academics to engage in industry?

3. Factors encouraging academics to engage in industry

Recent financial crises that limited the governmental funding for the universities led scholars toward engaging in industry. Despite lack of general consensus, they have introduced a number of motives to account for the current trends.

3.1. Financial / economic motives

Securing funds from industrial bodies for research purposes is a significant motif for academics to collaborate and solve real problems (Lee, 2000). In some cases, academics take industry as a source of revenue and personal income to speed up their research activities (Walsh, Baba, Goto, & Yasaki, 2008). Unlike Azagra-Caro, Aznar-

Marquez, and Blanco (2008)) and D'Este and Perkmann (2011), many scholars (Nelson, 2004; Partha & David, 1994; Perkmann & Walsh, 2008) have pointed out the role of monetary incentives in stimulating academics' interest in industry; perhaps because academics view the financial supports as not only a way for increasing their total earnings, but a source for funding their projects (Nilsson, Rickne, & Bengtsson, 2010).

3.2. Scientific motives

Despite its seemingly negative effects on academics' freedom (Nelson, 2004) and their publication opportunities (Arvanitis, Kubli, & Woerter, 2008), engagement in industry provides academics with new opportunities to implement their theories, deepen their knowledge (Arza, 2010), develop new technologies (De Fuentes & Dutrenit, 2012), improve their learning (Lee, 2000), and satisfy their curiosity (Hagstrom, 1965). Likewise, academics who learn through experience can receive expert comments and feedback (Arvanitis et al., 2008), become aware of the strengths and weaknesses of their assumptions and/or theories (Ankrah, Burgess, Grimshaw, & Shaw, 2013), and co-author high-quality papers with industrial stakeholders (D'Este & Patel, 2007). Besides, as limited access to up-to-date facilities may hinder the progression of research projects at universities, the U-I links can increase academics' access to infrastructures such as well-equipped laboratories and expensive materials (Ankrah et al., 2013), state-of-the-art techniques (Santoro, 2000) and up-to-date equipment (Acworth, 2008).

3.3. Social motives

The social pressure that calls for universities' contribution to solving economic problems represents the third category of the motives (Liefner & Schiller, 2008) that encourage scholars to transfer their knowledge to the industrial world which, in turn, can create many employment opportunities for academics and other interested parties (Huszár, Prónay, & Buzás, 2016). Other positive consequences would be enhanced reputation and recognition of the academics inside and outside their scientific communities and the higher education sector (1973, Goethner, Obschonka, Silbereisen, & Cantner, 2012; Merton, 1957; Siegel, Waldman, Atwater, & Link, 2004), their improved social prestige (Dietz & Bozeman, 2005), their high self-confidence (Jacob, Hellström, Adler, & Norrgren, 2000) and their great chances for further collaboration with industry to solve social problems (Perkmann et al., 2013).

3.4. Psychological motives

Psychological and personality factors, which are themselves affected by the value system of society (Ta-Cheng, 1997), make up another category of motives which stimulate the academics' entrepreneurial intentions, thereby controlling their urges for entrepreneurship activities (Cantner, Goethner, & Silbereisen, 2017). Kuanui, Thomas, Rubens, and Sherman (2010)) have categorized the psychological motives into intrinsic (spiritual, religious, and cultural) and extrinsic (financial) types. Both categories involve in defining human behaviors (Carsrud & Brännback, 2011), although some scholars (Carree & Verheul, 2012) highlighted the higher impacts of intrinsic motives (Lam, 2011).

People's cultural and religious values can act as motives for their entrepreneurship activities (Morris & Schindehutte, 2005). To satisfy their religious and spiritual needs, entrepreneurs create new firms and improve their growth and development (Kinjerski & Skrypnik, 2004). They can also integrate their morals and values into the working environments (Silk, 2007) and share their personal values with their colleagues (Kuanui, Thomas, Sherman, Waters, & Gilea, 2008; Pio, 2010). Setting up a new business to promote reli-

Table 1
Typologies of academics based on their tendency to work with industry (Lam, 2010).

Beliefs about academia and industry boundary	Extent and modes of engagement with industry	Main motivating factors	Perceived legitimacy of commercialization	Boundary work strategies and role identities	Boundary work strategies and role identities
Type I 'Traditional'	believes academia and industry should be distinct and pursue success strictly in academic arena	some collaborative links but of an intermittent nature	Mainly to obtain funding and resources for research	Resistance seen as an assault on academic ethos and autonomy	Boundary separation and expulsion -Retain extant academic role identity
- Type II 'Traditional hybrid'	believes academia and industry should be distinct, but also recognizes the need to collaborate	mainly collaborative links with intermittent involvement in some commercial activities	-Funding and resources for research most important amongst other factors	Accommodation -not necessarily desirable but an inevitable development	-Boundary testing and maintenance -Retain and protect dominant academic identity
Type III 'Entrepreneurial hybrid'	believes in the fundamental importance of science-business collaboration but recognizes the need to maintain boundary	continuous engagement in a range of collaborative and commercial activities	Funding and resources for research most important Application/exploitation of research, knowledge exchange and professional networking also important	Incorporation and cooptation -pursue commercialization but not all its associated meanings	Boundary negotiation and expansion -Hybrid roles but retain strong focal academic identity
Type IV 'Entrepreneurial'	-believes in the fundamental importance of science-business collaboration	continuous engagement in a range of collaborative and commercial activities strong commercial ties with firms	Application/exploitation of research most important -Funding and resources for research, knowledge exchange and professional networking also important -personal pecuniary gains also relevant	Acceptance and Veneration commercial practices embedded in work routines	Boundary inclusion and fusion -Fuse dual role identities

gious values is in fact a way to express one's thanks to God (Morris & Schindehutte, 2005), and financially support people in need (Balog et al., 2014) and their employees who need a job to earn a living (Kauanui et al., 2008).

4. Research framework

For a comprehensive analysis of academic researchers' spiritual and religious motives for entrepreneurship activities, we employed Lam's (2010) typology as well as Fitrah Tendencies framework whose bases are Islamic teachings that do not distinguish Muslims from non-Muslims (Rafei Atani, 2018). The choice of the Fitrah framework was because of the belief that in addition to their materialistic side, all human beings take advantage of a number of common spiritual motives that constitute their natural human disposition for initiating their activities (2013, Ghafoorinezhad, 2010; Javadi Amoli, 2007). The framework consists of the following dimensions:

- 1 *The search for truth*: Man has the desire to continuously learn, acquire new knowledge, find answers to their intrinsic curiosities, and understand the wisdom underlying the worldly phenomena. The highest level of this desire manifests itself in the form of their urge to know God and His creatures (Mutahhari, 2013; Shah Abadi, 1981).
- 2 *Profit-mindedness*: Man intends to maximize their economic, commercial, and personal interests. Hence, they try to avoid losses and eliminate any factors that endanger their interests. Based on Islamic teachings, the greatest benefits come when man builds a better relationship with God and obtain His consent (Mutahhari, 2011).
- 3 *The urge for power*: Man has a tendency to exercise influence over others. That is why they are after taking on leadership roles,

receiving other people's respect, achieving a higher social status, etc.. According to the verses of the Qur'an, the main source of power is God and divine satisfaction will guarantee the invincibility of man (Shah Abadi, 1981).

- 4 *Seeking joy and welfare*: Man searches for happiness, peace, and pleasure. According to Islamic principles, the highest level of pleasure comes from spiritual and moral activities that are, indeed, in line with the commands of God (Shah Abadi, 1981).
- 5 *The desire for freedom*: Man puts efforts into reducing the negative effects of external forces on their lives. They have a desire for freedom and are willing to act autonomously. Based on Islamic teachings, it is impossible to obtain freedom without keeping one's mind focused on God Who is present in the lives of pious people, for they show autonomous behaviors and resist against evil temptations (Musavi Khomeini, 2007; Mutahhari, 2011).
- 6 *The desire for beauty*: Man is interested in order, purity, proportion, art, poetry, and music. The more spiritual the beauties are, the more appealing they are to human beings (Mutahhari, 1994).
- 7 *The willingness to worship God*: Man has the desire to respect people who possess salient characteristics. God is at the highest level of perfection, and if humans keep their minds focused on God, their willingness to worship Him and accept His divine commands will increase (Musavi Khomeini, 1992).
- 8 *The passion for immortality*: Being aware of death as a definite phenomenon for all creatures, man tries to increase their lifespan, and maintain a good name in the society where they live (Mutahhari, 1998).
- 9 *Feelings of love and admiration*: Man has the tendency to express love and respect for others such as their family and even animals. Their patience and compassion towards others is also manifested in their behaviors. The love that aims at achiev-

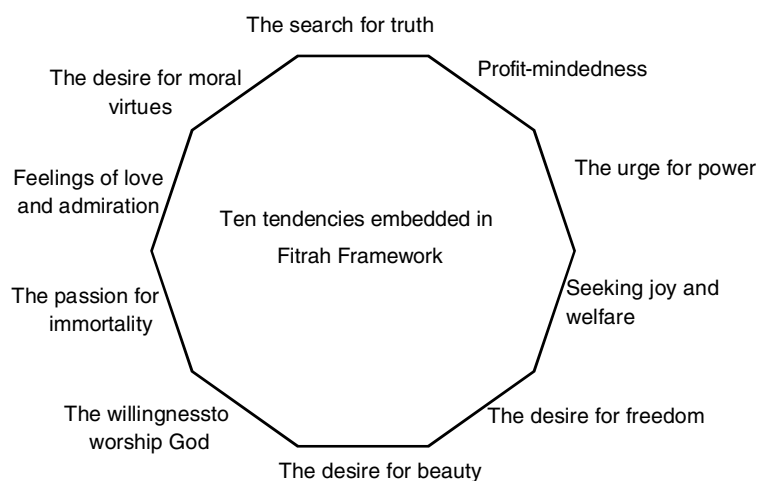


Fig. 1. The Fitrah framework.

ing God's satisfaction and spiritual goals is extremely valuable (Mutahhari, 2014).

10 The desire for moral virtues: Man shows interest in positive qualities such as honesty, justice, and consequently altruism as the highest level of moral development (Mutahhari, 1994).

Considering these more or less permanent human qualities (Fig. 1), we deductively analyzed the decision-making acts of traditional (T), traditional hybrid (TH), entrepreneurial hybrid (EH), and entrepreneurial (E) academics.

5. Research methodology

To gain insights into the academics' motives for entrepreneurship activities and extend the previously proposed theories, an exploratory qualitative study was conducted based on semi-structured interviews. Participants of the study were the promising young members of Iran's National Elites Foundation (INEF) – an organization to recruit and support researchers who have published scholarly papers in internationally acclaimed journals. The interviewees were all Muslim, yet this could not skew the results, as the Fitrah framework recognizes as equal all men regardless of their religion and culture (Musavi Khomeini, 2007). In other words, all men enjoy the above 10 innate inclinations and try to simultaneously satisfy all of them in their acts of decision making. As different factors such as religion, social conditions, and education can lessen or improve the strength of these innate motives, the differences among human beings lie in the intensity of their motives, with no one deprived of them (Rafiei Atani, 2018). For example, although the followers of Confucius learn to reduce their self-interests, (Ta-Cheng, 1997), they can never eliminate their profit-mindedness.

As INEF does not make its database accessible to the public, we prevailed on one of the INEF members with expertise in electronic engineering to participate in the interview. The rest of the interviewees (i.e., 61 academic researchers) were selected through snowball sampling that helped us find participants with shared characteristics (Palinkas et al., 2015). In the invitation letters, the potential participants (i.e., 77 academic researchers) were informed about the purpose of the study and the confidentiality of their responses.

As Iranian entrepreneurship programs focus on universities of science and technology that offer engineering courses (Dutta, Lanvin, & Wunsch-Vincent, 2016), we only selected the participants who had majored in science and engineering fields and excluded those specialized in social and natural sciences (Arvanitis et al., 2008; Louis et al., 1989; Owen-Smith & Powell, 2001; Stuart &

Ding, 2006). Table 2 presents the demographic profiles of the main participants

To select and classify the participants into different groups of academic researchers, we posed some preliminary questions based on the following motives identified by Lam (2010):

- Traditional academics: 1) writing papers and publishing books, 2) conducting research for the sake of research (i.e., basic research), and 3) formulating theories.
- Traditional hybrid academics: 1) applying research outcomes, and 2) solving industrial/ societal problems
- Entrepreneurial hybrid academics: 1) patenting, 2) participating in commercialization of scientific and technological developments, and 3) selling their technical knowledge.
- Entrepreneurial academics: 1) development of NTBFs¹, and 2) active participation in commercialization of science and technology.

Table 3 shows how the interviewees were selected and classified: As no specific formula has been introduced for calculating sample sizes in qualitative studies, we interviewed the participants up to the point of data saturation where no further information could be added to the obtained data. This point corresponded to the 13th, 14th, 12th, and 10th interviews that could help us come up with the underlying themes of T, TH, EH, and E groups respectively. It should be noted, however, that the overall number of interviewees (i.e., 62) was more than the sum of these figures (i.e., 13 + 14 + 12 + 10 = 49), as experts suggested continuing the interviews to ensure that the data had not been saturated by accident.

Prior to the interview sessions, a list of three questions for each group of the participants was prepared (Fig. 2). However, as the interviews went on, further questions were raised to figure out what the interviewees really meant by their responses. After analyses of the interviewees' responses, their extracted motives were integrated into their corresponding themes in the Fitrah framework.

It took about 45 min to hold each audio-recorded interview session. Then, we prepared the audio scripts and performed selective coding to check if the extracted themes corresponded to the defined layers of the Fitrah framework.

Table 4 examples of selective coding:

5.1. Validity of the instrument

The interview questions revolved around commercialization of research, religious motives of the academic researchers, and their preferred research methods. To ensure the content validity of the interview questions, a panel of 8 experts including 2 academics specialized in each of the dimensions of the interviews checked the developed questions, suggested some changes in the order and wording of the questions, and taught the interviewer how to manage vague or irrelevant responses of the interviewees.

² Iran University of Science and Technology (IUST)

³ Sharif University of Technology (SUT)

⁴ Amirkabir University of Technology (AUT)

⁵ Khajeh Nasir Toosi University OF Technology (KNTU)

⁶ University of Tehran (UT)

⁷ University of Kashan (UK)

⁸ Information and Communication Technology (ICT)

⁹ Tarbiat Modares University (TMU)

¹⁰ Shahid Beheshti University (SBU)

¹ New Technology Based Firm (NTBF)

Table 2
Info of interviewees.

No. of interviewees	Scientific discipline	Grade (No.)	University (No.)
Traditional group			
8	Electronic Eng.	PhD student (5), MSc (2), MSc student (1)	IUST ² (3), SUT ³ (2), AUT ⁴ (1), KNTU ⁵ (2)
4	Computer Eng.	PhD student (3), MSc student (1)	SUT (2), UT ⁶ (1), IUST (1)
3	Chemistry	PhD student (3)	UT (2), AUT (1)
2	Mechanical Eng.	PhD student (1), MSc (1)	SUT (1), IUST (1)
Traditional hybrid group			
4	Mechanical Eng.	PhD student (2), MSc student (2)	SUT (1), UT (3)
5	Metallurgical Eng.	Postdoctoral researcher (1), PhD (2), MSc (2)	IUST (2), UK ⁷ (2), KNTU (1)
5	Electronic Eng.	PhD student (2), PhD (1), MSc student (1), MSc (1)	AUT (3), SUT (2)
3	Software Eng.	PhD (1), PhD student (2)	AUT (1), UT (2)
Entrepreneurial hybrid group			
4	Biotechnology	PhD student (4)	UT (4)
5	ICT ⁸	MSc (2), MSc student (1), PhD student (2)	UT (2), SUT (2), IUST (1)
3	Metallurgical Eng.	MSc (2), PhD student (1)	IUST (2), AUT (1)
3	Mechanical Eng.	PhD student (2), PhD (1)	SUT (1), TMU ⁹ (2)
Entrepreneurial group			
4	Biotechnology	PhD student (3), PhD (1)	UT (2), SBU ¹⁰ (2)
6	ICT	MSc (4), MSc student (1), PhD student (1)	UT (2), SUT (2), AUT (1), IUST (1)
3	Mechanical Eng.	MSc student (1), MSc (2)	KNTU (1), UK (1), AUT (1)

Table 3
Selection and Classification of the Interviewees.

Question	Answer	Motivation for relationship with industry	Group
Are you interested in engaging in industrial activities? if so, what objectives do you pursue in your relationship with the industry?	Considering the new subjects and issues in NTBF of the electronic industry, there exists a suitable opportunity for publishing joint projects with R & D professionals of the companies.	writing papers and publishing books	T
	The poor facilities and equipment of the universities do not allow us to do technical tests and operationalize theoretical studies on a small scale. However, better results can be obtained in the industrial sector.	applying research outcomes	TH
	For commercialization of my inventions, I myself must do something. Because I have the required technical knowledge for this invention, and of course I should get help from the rest of the professionals and teams especially regarding marketing and management of technology.	participating in commercialization of scientific and technological developments	EH
	Considering current Iranian market's good opportunities for commercialization of raw materials in pharmaceutical industry, I prefer to start entrepreneurship by establishing NTBF.	development of a NTBF	E

Table 4
Examples of the relationships between the selected codes and layers of the Fitrah framework.

Defined layers of the Fitrah Framework Codes (C)	Searching for truth	Profit-mindedness	The urge for power	Seeking joy and welfare	Feelings of love and admiration	The passion for immortality	The desire for freedom	The desire for beauty	The willingness to worship God	The desire for moral virtues
The need for fully understanding God	•									
Achieving a higher social status			•							
Testing and implementing theories		•								
Accessing to up-to-date equipment		•								
The desire for doing good deeds										•
Building a prestigious reputation			•							
The felt freedom in economic environments							•			

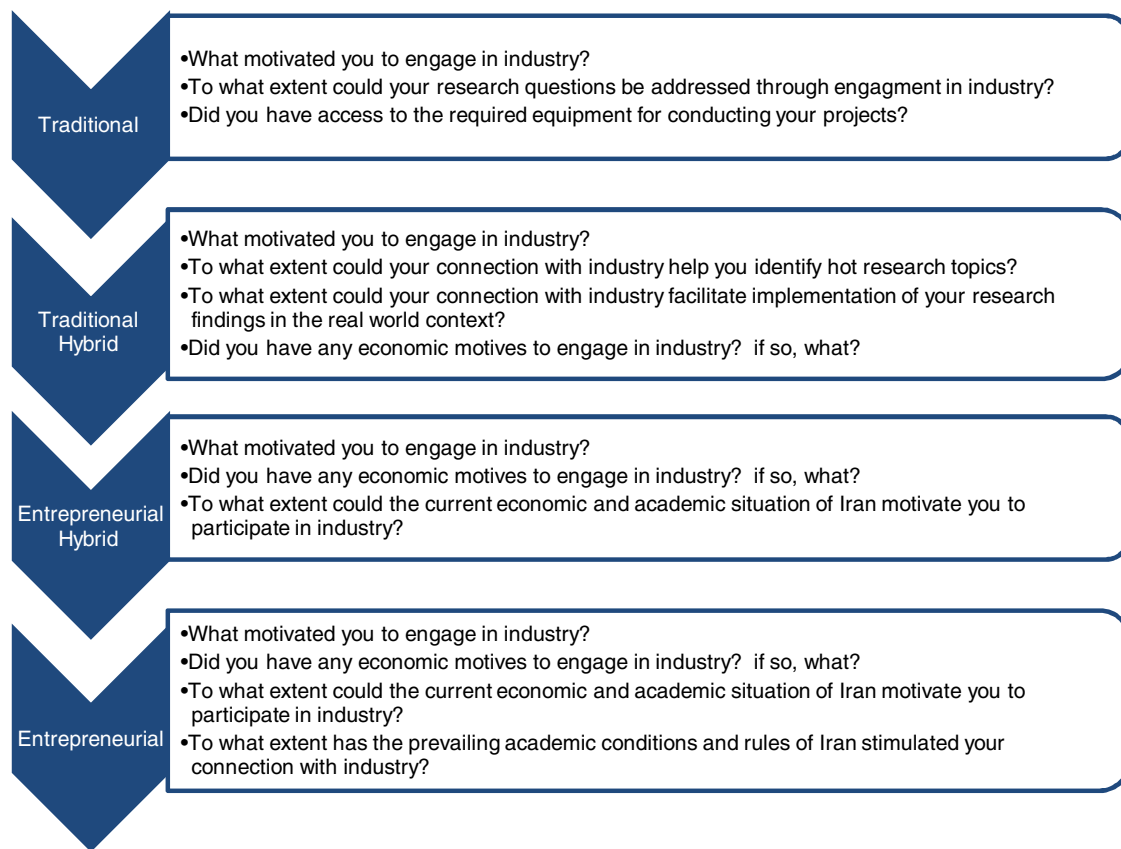


Fig. 2. English Translation of Interview Questions.

5.2. Reliability of the coding

To ensure the reliability of the coding, the same rater re-analyzed 34% of the transcripts three weeks after the first coding. The results showed acceptable (i.e., $\geq 60\%$; McHugh, 2012) levels of agreement (79, 72, 70, and 81 % corresponding to T, TH, EH, and E groups, respectively) between the first and second coding of the data. To reduce the coder's bias, an inter-coder reliability analysis was also performed, during which a second coder's fair (i.e., 60 %) agreement was obtained after his analysis of 26% of the first coder's already analyzed transcripts.

6. Results and discussion

Based on the themes extracted from the interviews, this section is divided into four parts to present the findings and address the research questions of the study.

Research question 1: Which motivational factors encourage traditional academics to engage in industry?

Analysis of the interviews (Table 5) showed that "searching for truth" (51%), "profit-mindedness" (33%), and "seeking joy and welfare" (6%) are the key motives of traditional academics for entrepreneurship activities. This group mainly looked for opportunities to understand the complexities of the universe and increase the depth of their knowledge about the worldly phenomena. According to one of the interviewees,

"Understanding the complex layers of the universe and its socio-economic systems is appealing to me. When I understand the scientific facts and the wisdom underlying the worldly phenomena, I come to feel an inner sense of pleasure and joy. That makes

me stay more focused on the research process than its products and applications."

The identified motives support the scholars' (Hagstrom, 1965; Lam, 2011) accounts concerning the traditional academics' tendency to explore hot research topics, and conduct further studies to thoroughly analyze scientific issues and satisfy their curiosity about the main causes of the phenomena. These findings further suggest that the traditional academics' motives were mainly of intrinsic type. Examples of the available evidence included the interviewees' expressed joy of achieving knowledge (Meyer-Krahmer & Schmoch, 1998), their increased interest in finding solutions to the problems (Perkmann & Walsh, 2008), and also their desire for sharing their findings with others (Murray, 2004) and exploring and exploiting the world's mysteries and beauties (Mubarak, Rahman, & Yaacob, 2014). Further, closely consistent with Islamic teachings (Mutahhari, 2015; Tabataba'i, 1987) were the interviewees' statements regarding the importance of taking the world as a divine creation to direct their studies towards a full understanding of God.

The second highest ranking motives (36%) of the traditional academics incorporated extrinsic factors such as financial sources of funding for their scientific projects. For example, one of the interviewees stated that:

I enjoy the pursuit of knowledge. Sometimes, we are caught up in Plato's so-called cave. We are too drowned in our thoughts to notice our surrounding changes and opportunities. To avoid this, we need to experience new contexts. When we interact with the stakeholders in the industry and get their comments, we may identify the gaps of which we had been ignorant. The craftsmen can also listen to our opinions and provide us with facilities and opportunities to test our theories in real contexts. My friends, instructors and I have had contact with industrial stakehold-

Table 5
The Extracted Themes and Their Related Percentages.

Academic researchers	The search for truth	Profit-mindedness	The urge for power	Seeking joy and welfare	Feelings of love and admiration	The passion for immortality	The desire for freedom	The desire for beauty	The willingness to worship God	The desire for moral virtues
T	51	33	3	6	2	1	0	1	0	0.6
TH	23	42	10	3	14	2	0	0	0.7	3
EH	1.8	40	0	2	45	0.9	0	0	0	9
E	0	56	0	0	28	0.8	8	0	0	6.8
Total	21	42	3	3	21	1	1	0.4	0.2	4.6

Note. T: Traditional Academics; TH: Traditional Hybrid Academics; EH: Entrepreneurial Hybrid Academics; E: Entrepreneurial Academics.

ers who have shown interest in our projects and financially supported them.

The interviewees further talked of establishing the U-I links as a way to improve their social status (Stuart & Ding, 2006) and academic rank (O'shea, Allen, Chevalier, & Roche, 2005), maintain a good name in the society after their death, have access to up-to-date equipment for testing and implementing their theories (Acworth, 2008; Arza, 2010; Santoro, 2000), take advantage of the university incentives such as grants (Bozeman & Gaughan, 2007), and eliminate the public pressure for solving social problems (Liefner & Schiller, 2008). Altogether, this latter finding confirms earlier reports (Ryan & Deci, 2000) on the strong effects of external factors on people's urges for taking up new activities.

Research question 2: Which motivational factors encourage traditional hybrid academics to engage in industry?

Unlike their traditional counterparts, the *traditional hybrid* academics expressed their great willingness to carry out applied research (76%), which was generally directed by three innate urges namely their "urge for power" (10%), "searching for truth" (23%) and "profit-mindedness" (42%). According to the interviewees' accounts and closely consistent with the findings of other studies (e.g., Lam, 2010), the desire to exert one's power and influence over others could help researchers retain and protect their academic identity (Stuart & Ding, 2006). Further, like their traditional colleagues, this group was encouraged to connect with the industry to gain knowledge about the available research opportunities, use the existing facilities and implement their theories.

Other factors that fall into the category of the hybrid traditional academics' intrinsic motives included the religious and psychological factors. One of the traditional hybrid academics believed that "... useful science [which is emphasized in religious sources] is one that is functional and can solve social problems ...". Another interviewee referred to introducing role models to society, as his motivation for conducting applied research, and finding solutions to the economic problems through academic research studies. He added that

"... as religious sources also point out, one of the best methods for promoting human values in society is modeling those behaviors. ... If we could put time and energy to solve some of the social problems, we would be able to introduce this successful model to academic researchers and then promote it ..."

As some of the interviewees put it, finding solutions to diverse economic issues creates a sense of joy and self-worth. Like their traditional counterparts, this group talked of issues such as maintaining a good name in society and, more religiously, the positive effects of achieving other people's satisfaction. These accounts confirmed the effectiveness of religious factors, which are specifically addressed in the Fitrah framework, on promoting academics to start new businesses (Morris & Schindehutte, 2005).

The *traditional hybrid* academics further talked of the positive consequences of their connections with the industry such as getting higher salaries, industrial grants, and research funds that could be conditioned by their amounts of achieved recognition (Stephan,

1996) and could continuously reflect and improve the so-called Matthew Effect (Merton, 1968). As the interviews continued, we explored a number of other extrinsic motivational factors that stimulated hybrid academics to engage in industry. This group highlighted the importance of co-authoring scholarly articles with specialists in the industrial sector as a way to improve their academic ranks. They also referred to their lack of academic career vacancies and job security in scientific contexts. Regarding this last factor, an interviewee stated that

"... the great number of PhD students who are being admitted to universities each year makes tougher the competition for recruitment as faculty members; hence, strengthening the U-I link can create alternative opportunities for employment".

Based on the above-discussed findings, it seems that the Iranian *traditional hybrid* academic researchers are completely aware of the importance of applied research, the causes of recent economic problems, and people's expectations of academics (Goethner et al., 2012). That might be the reason for their exerting best efforts to play a role in solving economic problems through joint projects with experts in the industrial sector (D'Este & Patel, 2007).

Research question 3: Which motivational factors encourage entrepreneurial hybrid academics to engage in industry?

The most effective motives which stimulated *entrepreneurial hybrid* academic researchers to engage in industry were "their profit-mindedness" (40%), "their love of all creatures" (45%), and "their desire for moral virtues" (9%). For example, one of the interviewees said "... my main interest is scientific activities, but when I consider the ruling [economic] conditions of my country and the existing potentials [for solving problems], I become motivated to play a role in commercialization of knowledge". Another interviewee added that "... in my opinion, injecting innovation into the industry and focusing on institutional and national incentives and [human] capabilities can solve our problems." From the perspective of this group and consistent with earlier studies (Ankrah et al., 2013; Mansfield, 1998), putting efforts to improve the economic situation of the country, responding to the academics' expectations, and using the available facilities efficiently can increase researchers' urges for cooperation in industry. This issue was further noted by an interviewee who stated that:

"Passing the law to support knowledge-based companies was one of the key opportunities that have been created [in the recent years in Iran] ... I think we should not expect the government to solve all the problems with unemployment and low productivity ... I mean the academics should play a role ..."

Unlike the traditional hybrid academics, this group believed that having a sacred look at people's financial needs and social concerns especially at the time when societies are entangled in serious economic problems is a high priority (Wright, 2014) that increases *entrepreneurial hybrid* (EH) academics' urges for entrepreneurship activities (Lam, 2010).

Intrinsic factors such as attempts for maintaining a good name in society, feelings of self-worth, and the joy of problem solving

were in the category of other frequently mentioned motives of the EH group. As for self-worth, they considered a high value for their academic identity and were keen to take on their assigned tasks. Meanwhile, in response to social challenges, they continuously engaged in collaborative and commercial activities that could provide them with opportunities for exploiting their research outcomes, exchanging their knowledge and developing their professional networks. By and large, these accounts could suggest that investments on science and technology infrastructures could act as sustainable ways to guarantee national development and motivate young EH researchers to carry out knowledge-based projects (Forida & Cohen, 1999).

Research question 4: Which motivational factors encourage entrepreneurial academics to engage in industry?

The *entrepreneurial* academics referred to “profit-mindedness” (56%), “their love of all creatures” (28%), and “their desire for freedom” (8%) as their main motives for participating in industry. Like EH group, this group were concerned about assisting the national economy, recruiting young researchers, eliminating social pressures, maintaining a good name in society, increasing their personal income, achieving qualifications for increasing their chances for employment and gaining a feeling of self-worth.

Besides their shared motives with other academics, the E group pinpointed their desire for freedom as an important urge for entrepreneurship activities and connection with the industry.

“... when I was admitted into the university and decided to work as a researcher, my ultimate goal was to be recruited as a faculty member... but as I got more familiar with the prevailing conditions, I felt that the university could not satisfy my inner urge... many of the studies have little to do with the social issues and apparently there is no other choice! ... because ISI rated articles cannot be written based on investigations that revolve around social needs...”, said one of the interviewees.

To put it another way, little connection between the working world and the academic context stimulates changes in the academics' goals and directs them towards entrepreneurship activities (Bercovitz & Feldman, 2008; Roach & Sauermann, 2010). As another interviewee stated,

“I think research is important, but, at present, our society needs more entrepreneurship activities. It is especially the case when [it is observed that] the world of entrepreneurship has more freedom than the academic environment and is more likely to exert its influence on the society.”

From the perspective of this group, restricted opportunities, that limit their activities to the academic contexts, inhibit the academics' creativity and its influence on society, which is a finding that is closely supported by previous studies (Latour & Woolgar, 2013; Mitroff, 1974). The negative impacts of conservative and risk averse atmosphere of the universities on people and the low-paid academic activities were two other important reasons that made academics turn to the industrial sector and commercialization of their knowledge. Simply put, the young researchers' tendency to take risks and increase their income stimulated them to do entrepreneurship activities (Walsh et al., 2008). This latter dimension, however, is in contrast with earlier findings (D'este & Perkmann, 2011).

All in all, being identified as a shared motivational urge among all four groups of the interviewees, profit-mindedness can account for 42% of the academics' expressed motives. Despite a lack of consensus regarding the priority level of economic and financial motives, this finding can be viewed in terms of changes in people's values and experiences over time (Bercovitz & Feldman, 2008). In this sense, regardless of their personal interest in scien-

tific activities, the researchers who had experienced the country's economic turmoil and sanctions tended to do entrepreneurship activities.

7. Conclusion

This study aimed at identifying the motivational factors that stimulate academic researchers' entrepreneurship activities and their connections with the industry. Due to the importance of spiritual and religious motives and the scarcity of related studies, an attempt was made to apply the Fitrah as a comprehensive framework of motivational urges. Holding several semi-structured interviews, we built on the researchers' accounts, endorsed previous scholars' findings and added extra motives to the model. The newly added motives included “the need for fully understanding God”, “the desire for doing good deeds”, and “the felt freedom in economic environments”.

“The need for fully understanding God” is due to man's' desire for seeking the truth. According to this motive, by observing the mysteries of nature and the orderliness of the universe and reflecting on them, man can know God (Neylisaaz & Baba Ahmadi Milani, 2013).

The entrepreneurs' desire for doing good deeds is associated with their desire for moral virtues (Mutahhari, 1994). As discussed earlier, sometimes entrepreneurs think of establishing firms as a means and opportunity for promoting their religious beliefs (Morris & Schindehutte, 2005) and refer to other people's financial assistance as valuable and good deeds (Balog et al., 2014).

Entrepreneurial freedom in economic activities leads to gradual self-organization as a way to improve entrepreneurship behaviors (Gjerding, Wilderom, Cameron, Taylor, & Scheunert, 2006). The academic entrepreneurs think of bureaucratic structures of their universities as barriers to their progress. The felt freedom in economic environments can enhance the academics' urge for doing entrepreneurship and economic and industrial activities on one hand and avoiding bureaucratic structures of academic contexts on the other (Coleman, 1999). The identified motives in this study helped deepen and develop Lam's typology and her spiritual and religious factors for motivating academics, especially the traditional group, to move towards entrepreneurship. Conducting empirical research on the identified motives of the present study and comparing its results with Lam's (2011) can clarify new dimensions of academic entrepreneurs' motives.

The limitations of this study fall into five main categories. First, we only investigated the motivational urges of academic researchers and discarded their counterparts who worked as instructors at the target universities. Second, the participants majored in science and engineering fields and researchers with expertise in other fields were not involved in the study. Third, due to availability issues, faculty members of the target universities were not interviewed. Fourth, because of snowball sampling, there may be a high probability that some of potential participants with new ideas and motives have been neglected. Fifth, because of the qualitative nature of the study, the results may not be generalized to other contexts. Hence, future studies are recommended to address these limitations through broadening the scope of the study, using other sampling techniques, and focusing on other groups of academics.

Based on the results of this study, economic and financial factors are the most important motives for doing entrepreneurship activities in Iran. Accordingly, it can be concluded that academic researchers' more inclination towards income-oriented entrepreneurship activities and less attention to scientific activities, may negatively affect the future growth and development of Iran. In this sense, policy makers are expected to increase the cur-

rent researchers' salaries. Further, based on the results of this study, policy makers should

- help *traditional* academics strengthen their relationship with science-based firms to be able to deepen their knowledge, improve their income, and satisfy their tendency to explore facts (Pavitt, 1984). Hence, based on the results corresponding to the first research question, this group of academics cannot only satisfy their tendency to search for the truth, but also make money and enjoy cooperation with the science-based firms to meet their two other tendencies (i.e., profit-mindedness and seeking joy and welfare).
- encourage national research projects, hold joint conferences with industry, facilitate patenting, and strengthen TTOs to increase traditional hybrid academics' opportunities for conducting applied research projects (Fabrizi, Guarini, & Meliciani, 2018). Additionally, opportunities can be provided for responding to THs' "urge for power" through increasing their social prestige and status and "profit-mindedness" through increasing their access to industrial equipment.
- strengthen the relationships of universities with science and technology parks, business incubators, accelerators, and venture capitals to stimulate entrepreneurial hybrid academics' activities. The researchers belonging to this group who are interested in participating in commercialization activities can increase their personal income, respond to their "profit-mindedness", and satisfy their "love of all creatures" by assisting the national economy and creating opportunities for employment of the youth. As they value entrepreneurship activities, they can also respond to their "desire for moral issues".
- encourage entrepreneurial academics' problem-solving activities by financially supporting their scientific projects. In so doing, the need for "profit-mindedness" is met and by increasing the freedom to act in economic contexts, "the desire for freedom" is satisfied. Creating effective social activities can also address "the love of all creatures".

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