Entrepreneur's Ambidexterity, Knowledge Brokerage and Firm Performance: Preliminary Findings

[1]Nurul Afza Hashim
Universiti Tun Abdul Razak
nurul.afza@unirazak.edu.my

[2]Ching Seng Yap
Curtin University, Malaysia
yapchingseng@curtin.edu.my

[3]Rizal Ahmad
Universiti Tun Abdul Razak
rizal@unirazak.edu.my

[4]Farah Waheeda Jalaludin
Universiti Tunku Abdul Rahman
farah@utar.edu.my

***Abstract*— An entrepreneur's ambidexterity or ability to simultaneously and synergistically pursue both exploitation and exploration activities has been found as having positive effects on business performance. However, little is known about the antecedents and consequences of ambidexterity in entrepreneurs. This study focuses on the role of social network and environmental dynamism in affecting entrepreneur's ambidexterity. Then, to examine the importance of an ambidextrous entrepreneur, the study hypothesizes its relationship with firm performance. Data were collected from 65 entrepreneurs in the technology sector using a questionnaire survey. Conference, trade fair and exhibition, and customer are the main sources of opportunity recognition perceived by the technology entrepreneurs. The findings reveal that environmental dynamism and social network are significantly related to entrepreneur's ambidexterity, which lead to enhanced firm performance. On the other hand, knowledge brokerage activities are found to have a significant mediating effect on the relationship between ambidexterity and firm performance.**

Keywords—environmental dynamism; social network; ambidexterity; knowledge brokerage; firm performance; technology entrepreneurs.

I. INTRODUCTION

How do entrepreneurs survive in the face of change? Underlying this question is the debate about whether entrepreneurs are able to adapt to fast changing global environments which are characterized by uncertainty, complexity and rapid technological change [1]. Drawing on from the literature of managerial ambidexterity, entrepreneurs have to divide their time and resources to exploit existing knowledge to solve short-term problems and explore new knowledge for long-term opportunities. Entrepreneurs tend to prioritize exploitation to exploration as the returns from the latter are less certain and take longer time to accomplish [2]. Entrepreneurs who could allocate balanced resources to exploration and exploitation are considered to be ambidextrous [3].

The literature refers to knowledge broker as an intermediary (an individual or an organization), who provides links, knowledge sources and knowledge itself to an organization. Knowledge brokers may consist of the employees within the organization or professional knowledge firms external to the organization [4].

The question of whether knowledge brokerage has an influence on the relationship between entrepreneur's ambidexterity and their business performance inspired the conduct of this study. In addition, ambidexterity research has mainly been conducted on organizational and team levels [5], research on the managerial level is still limited [6]. Moreover, knowledge brokerage is prevalent in science, technology and innovation fields [7] as well as environment and sustainable development policy [8], research on the role of knowledge brokerage in entrepreneurial enterprises remains unexplored. Therefore, the study attempts to examine the antecedents to entrepreneur's ambidexterity, to examine the relationship between entrepreneur's ambidexterity, knowledge brokerage, and firm performance. Data were collected from 65 entrepreneurs in the technology sector in Malaysia via a questionnaire survey. Quantitative technique was used for data analysis to answer the research questions. It is hoped that entrepreneurs will benefit from the study by gaining insight into the specific functions of knowledge brokerage and its relationship with ambidextrous entrepreneurs and their entrepreneurial performance.

The project is funded by the Fundamental Research Grant Scheme, Ministry of Higher Education, Malaysia.

II. LITERATURE REVIEW

A. Managerial Ambidexterity

The term ambidexterity was first coined by [9] in his study of dual structure in organizations. Ambidexterity can be viewed from organizational, unit or individual perspectives. This study views ambidexterity from the entrepreneurial or managerial perspective. An ambidextrous organization manages business activities involving different time horizons and managerial capabilities. On the other hand, building on [2] organizational learning framework, an ambidextrous entrepreneur or manager is said to be able to seek a balance between exploration and exploitation activities and thus enable them to perform better than others who focus on either type of activities.

Being one of the few studies that examined ambidexterity from the individual perspective, [10] defined managerial ambidexterity as "a manager's behavioral orientation toward combining exploration- and exploitation-related activities within a certain period of time. Exploration activities involve searching for new markets needs and technological opportunities which require the development of new knowledge [11]. On the other hand, exploitation activities are focusing on efficient production of existing product-market positions which entail the use of existing knowledge [11].

Both exploration and exploitation activities are competing for limited resources and require distinctive sets of skills and capabilities. To be ambidextrous, organizations trade off short-term productivity for long-term innovation, as well as stability for adaptability [2, 12].

978-1-5090-6255-3/17/$31.00 ©2017 IEEE

B. Knowledge Brokerage

Gould and Fernandez (1989) [13] recognized five different types of brokers based on their role in facilitation of knowledge flows within and between organizations. Brokerage relations involve three actors. Two actors are the actual parties to the transactions and the third actor is the intermediary or broker. The first type of broker is called coordinator who enhances interaction between members of the group he belongs to. The second type is called cosmopolitan or itinerant where the principals belong to the same group while broker belongs to a different group (an outsider). The third type of broker is called gatekeeper where the broker absorbs knowledge from a group and passes it to the group he belongs to. The fourth type is called representative who diffuses the knowledge of the own group to another group. The last type of broker is called liaison, an outsider who enhances interaction between two groups [1].

According to [14], knowledge brokerage can take place at four levels where value can be created. The first level is to make individuals at both sides of a structural hole aware of interests and problems in the other group. The second level is to transfer best practices from one group to another. The third level of knowledge brokerage involves drawing analogies between groups which are seen to be irrelevant to one another. The highest level of knowledge brokerage is synthesis of new belief and behaviors from both groups.

Notwithstanding the role of knowledge brokerage in technology and innovation research, the similar research has not received adequate attention from the business researchers, especially in the literature of entrepreneurship. Therefore, this study posits that knowledge brokerage practices will have a positive influence on entrepreneurial performance.

C. Research Hypothesis

When a firm is operating in a highly dynamic environment, entrepreneurs are required to explore new opportunities to meet the changing demand of customers. Whereas, when a firm is operating in a less dynamic environment, focus can be on exploiting the existing operations in a more efficient manner [15]. However, this study argued that a firm will tend to achieve ambidexterity when facing increasingly dynamic environment which is prevalent in the business setting today. Therefore,

H_1: The higher the perceived environmental dynamism, the higher the engagement in ambidexterity activities by entrepreneurs.

Entrepreneurs with a stronger social network external to the organization tend to focus more on exploration activities. On the other hand, entrepreneurs with a stronger social network within the organization tend to prioritize exploitation activities. Together, by having strong social network both internally and externally, entrepreneurs possess dual knowledge foundation for exploitation and exploration activities, and thus it is argued to positively relate to ambidexterity [16]. Therefore,

H_2: The stronger the social network of entrepreneurs, the higher the level of entrepreneur's ambidexterity.

The literature revealed that firms involved in both exploration and exploitation activities through ambidexterity are more likely to achieve better performance compared with firms focusing on either dimension [11, 17]. Firms focusing too much on exploitation may risk losing out the exploration of new ideas. On the other hand, firms concentrating too much on exploration may lead to new ideas being underdeveloped and unrealized in the markets. Both practices will lead to poor performance in the long term. In order to achieve success in both short and long term, firms need to seek an optimum balance between exploration and exploitation activities, or being ambidextrous.

Organizational ambidexterity is found to be an important antecedent to the sustained competitive advantage of firms. This study argues that an ambidextrous entrepreneur has a more likelihood of performing better than entrepreneurs who only focus on either exploration or exploitation activities. To achieve excellent business performance, entrepreneurs are required to have recognized the opportunity in the market and commitment from internal operations. Therefore,

H_3: The higher the level of entrepreneur's ambidexterity, the higher the level firm performance.

A meta-analysis conducted by [18] revealed that ambidexterity-performance relationship is moderate and affected by contextual factors and methodological choices. Specifically, the relationship is stronger when perceptual measures for both variables are used and cross-sectional and multi-method research design are applied. This study argues that knowledge brokerage as a contextual factor that mediates the relationship between entrepreneur's ambidexterity and firm performance. An ambidextrous entrepreneur will be able to achieve a higher business performance through active engagement in knowledge brokerage activities as knowledge brokers are able to provide new and specific knowledge where entrepreneurs may not possess. Therefore,

H_4: The relationship between entrepreneur's ambidexterity and firm performance is mediated by knowledge brokerage activities.

III. METHOD

A. Data Collection Method

Primary data were collected using an interviewer-administered questionnaire survey. Interviewers were present when respondents were filling out the questionnaire to answer any doubts they might have about the questions.

B. Sample and Sampling Procedures

The population of the study consists of entrepreneurs in the technology sector in Malaysia. The sector is selected based on the basis that a high level of specific knowledge is needed in research and development of products and services. The sample was selected from the business directories such as Federation of Malaysian Manufacturers, Multimedia Super Corridor, and Bursa Malaysia. A total of 1,000 firms were randomly selected and 81 firms participated in this research but only 65 returned with completed survey forms, a response

rate of 6.5%. It is expected that the number of respondents will continue to increase as data collection effort is still on-going.

TABLE I. Sample Characteristics (n = 65)

Demographic Variable	Per cent
Owner	
Yes	20
No	80
Position	
Partner / Associate / Exec.Dir. / Dir. / CEO	23
General Manager / COO / Vice President	12
Senior Manager	14
Manager	39
Assistant Manager	12
Highest Qualification	
Secondary School	8
Diploma / Advanced Diploma	8
Bachelor's Degree / Professional Cert.	72
Master's Degree	11
Doctorate Degree	1
Firm Characteristics	**Per cent**
R&D	
Yes	71
No	29
Year firm established	
10 years and below	20
More than 10 years	80
No. of Employees	
Below 100	46
100 to 500	32
Above 500	22

C. Variables and Measurement

Perceived Environmental Dynamism. Perceived environmental dynamism is defined as to the rate of change and the degree of instability of the environment [19] and measured by 5 items adopted from [15]. The sample item includes "In our local market, changes are taking place continuously".

Social Network. An entrepreneur's social network is determined by network connectedness in terms of frequency of interaction, relationship duration and emotional intensity [16]. Frequency of interaction is measured by number of contacts at least once a week with both staff from internal and external of the organization. Relationship duration is measured by the number of years an entrepreneur has known the critical contacts. Emotional intensity is measured by the closeness with these contacts, anchored from 1: not close at all to 5: extremely close [20].

Entrepreneur's Ambidexterity. Entrepreneur's ambidexterity is viewed as a personal attribute that refers to the ability to pursue both exploration and exploitation activities at the same time. Ambidexterity will be computed by multiplying the score of both activities. The measures for exploration and exploitation activities are adopted from [10] and consist of seven items respectively. All items were measured along the scales of 0: not used at all; 1: low, 2: medium, and 3: high. The sample item for exploration activities include "Evaluating diverse option with respect to products/services, processes, or market" and for exploitation activities include "Activities which you carry out as if it were routine".

Knowledge Brokerage. Knowledge brokerage activities are measured in terms of its functions instead of roles. Four items adopted from [14] are used to collect the frequency of knowledge brokerage activities, measured along the scales of 1: not used at all, 2: low, 3: medium and 4: high. The sample item includes "Transferring of best practices from other firms to my firm".

Firm Performance. Firm performance can be defined as the degree to which firms attain all the purposes they are supposed to [21]. Respondents are asked to indicate their level of agreement on their firm performance relative to their major competitors in the past three years in terms of operating profit, revenue growth, ROA, and ROI [22], measured along the scale of 1: among the worst, 2: bottom half, 3: average, 4: top half, and 5: among the best.

IV. RESULTS

A. Descriptive Analysis

As shown in Table 2, among all sources of knowledge listed, conference / trade fair / exhibition was perceived to be the most reliable source about new business opportunities among the entrepreneurs, followed by customer. In addition, sources of print media, online media, Internet and social media, board members, and business partners / alliance were perceived to be reliable by the entrepreneurs. On the other hand, religious community, sports / leisure club, NGO / third sector, and bank and financial institution were not perceived to be reliable sources in recognizing new business opportunities.

TABLE II. Source of Knowledge (in per cent)

Source	0	1	2	3
1. Federal Government	23	**36**	26	15
2. State Government	22	**44**	26	8
3. Local Council	20	**38**	34	8
4. Media – Print	15	23	**47**	15
5. Media – Online	12	15	**45**	28
6. Internet / Social Media	8	8	**46**	38
7. Chamber of Commerce	19	**35**	31	15
8. Conference / Trade Fair / Exhibition	6	26	26	**42**
9. Industry Association	9	29	**39**	23
10. Professional Association	12	28	**37**	23
11. Bank / Financial Institution	**32**	22	28	18
12. Consulting Firm	23	32	**31**	14
13. NGO / Third Sector	**38**	31	26	5
14. University / College / Research Inst.	31	**34**	26	9
15. Social Community	28	**35**	31	6
16. Religious Community	**52**	22	22	4
17. Sports / Leisure Club	**48**	22	26	4
18. Family Member / Relative	23	29	**37**	11
19. Personal Friend	15	25	**41**	19
20. Internal Employee	6	26	**40**	28
21. Board Member	20	22	**46**	12
22. Business Partner / Alliance	11	17	**47**	25
23. Customer	5	18	37	**40**
24. Competitor	25	**34**	26	15
25. Supplier / Vendor	5	26	**40**	29

Note: 0 – Not used at all; 1 – Low; 2 – Medium; 3 – High.
The highest frequency within the source is bolded.

All activities of knowledge brokerage were practised at medium level among the entrepreneurs, of which creating

awareness of interests and problems of other firms in the organization received the highest medium score by the entrepreneurs.

B. Hypothesis Testing

Partial least squares path modeling (PLS-PM) with R [23] was used in data analysis and hypothesis testing. PLS-PM is a multivariate statistical technique that allows simultaneous evaluation between multiple variables. PLS-PM involved two stages of analysis – evaluation of measurement model and structural model. The measurement model evaluates reliability and validity of the items and constructs while the structural model evalautes effect size, direction, and significance of the hypothesized relationships. As the sample size is very small at this stage, additional test was conducted to ensure the data analysis is sufficient to minimize Type II error (Statistical power of more than 80%). GPower 3.1 was used to compute a statistical power analysis. This study chose to detect a population effect size represented by f^2=0.30, based upon the findings of past research, and is also the moderate effect size proposed by [24]. For controlling Type I error, α is set at the 0.05 significance level, which is the norm in social science research. For controlling Type II error, the power of the test is set at 0.80, the level recommended by [24] and adopted generally by researchers. Using G*Power 3.1.9.2 F tests [25], the required number of sample size is 64. As the sample size for this study is 65 which exceeds the required number, it can therefore be concluded that the study has sufficient power to detect the required effect size of 0.30.

C. Assessment of the Measurement Model

As shown in Table 3, all reflective constructs were deemed reliable and valid. All scores exceeded the minimum requirement of Cronbach's alpha, composite reliability, and average variance extracted (AVE) [26]. The discriminant validity of the items was evaluated by comparing the squared roots of AVE and correlation coefficients between constructs. All the squared roots of AVE on the diagonal line are higher than the correlation coefficients between constructs, indicating discriminant validity at the construct level. All reflective items were loaded higher than 0.60 within the respective constructs – environmental dynamism (0.75 – 0.86), knowledge brokerage (0.74 – 0.85), and firm performance (0.74 – 0.87), and were loaded low across other constructs, indicating adequate convergent validity and discriminant validity at the item level. As the requirements of reliability, convergent validity, and discriminant validity at both construct and item levels are met, the data analysis proceeds to evaluate the structural model.

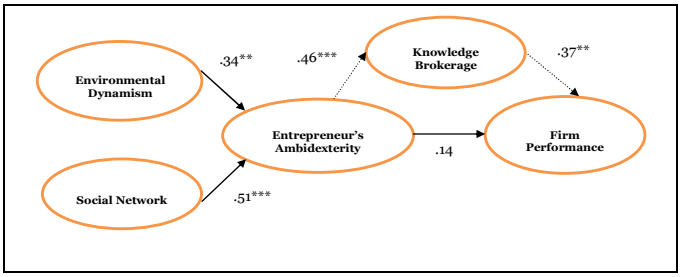
TABLE III. Correlation Matrix

Variable	M	SD	α	CR	1.	2.	3.	4.	5.
1. ED	5.10	1.06	0.81	0.88	**.80**				
2. SN	27.10	25.22	-	-	.03	-			
3. EA	23.17	8.08	-	-	.35	.52	-		
4. KB	1.82	0.64	0.82	0.88	.27	.43	.46	**.80**	
5. FP	3.43	0.89	0.93	0.95	.28	.12	.28	.37	**.91**

Note. ED – Environmental dynamism; SN – Social network; EA - Entrepreneur's Ambidexterity; KB - Knowledge Brokerage; FP - Firm Performance; Diagonal values are squared root of AVE; α – Cronbach's alpha; CR – Composite reliability. Social Network and Entrepreneur's Ambidexterity are computed indices.

D. Assessment of the Structural Model

The structural model as presented in Fig. 1 shows that both environmental dynamism and social network are significantly related to entrepreneur's ambidexterity. However, the relationship between environmental dynamism and entrepreneur's ambidexterity (β = .34, t = 3.37, p = .001) is relatively weaker than the relationship between social network and entrepreneur's ambidexterity (β = .51, t = 5.14, p < .001). Both environmental dynamism and social network explain slightly over a third of the variance for entrepreneur's ambidexterity (R^2 = .39). It is also found that entrepreneur's ambidexterity is positively and moderately related to knowledge brokerage (β = .46, t = 4.08, p < .001), which in turn, positively related to firm performance (β = .37, t = 3.13, p = .003). A further analysis reveals that the indirect effect of entrepreneur's ambidexterity on firm performance is significant (β = .139) and slightly larger than its direct effect (β = .137). Knowledge brokerage explains merely 14% of the variance for firm performance. Overall, the Goodness of Fit Index stands at 39.5%. In sum, all the hypotheses tested are supported by the data.



Note. ** p < .01; *** p < .001

Fig. 1. Structural Model.

V. CONCLUSION

A. Implications for Research

Firstly, the study introduced the ambidexterity concept in the context of individual level of entrepreneurs, which is lacking in the literature. Further, the study tested the antecedents of environmental dynamism and social network to entrepreneur's ambidexterity. The significant findings of the study confirmed the managerial ambidexterity literature in the context of entrepreneurs in an emerging economy. The study also introduced knowledge brokerage activities as the mediator between ambidexterity and firm performance. The results provide empirical evidence for the proposed conceptual framework.

B. Implications for Practice

Entrepreneurs should attempt to achieve ambidexterity, which is to seek a balance between exploration and exploitation activities in their business operations. Entrepreneurs operating in a highly dynamic environmental and maintaining a strong social network both inside and outside the firm would benefit from engaging in ambidexterity. While ambidexterity would not directly lead to enhanced firm performance, knowledge

brokerage activities play an important role to improve business performance.

C. Limitations and Recommendations

The sample size of this study is limited to less than a hundred, which reduced its generalizability to the larger population. However, as the data collection is still on-going, it is expected that the larger sample size will improve the external validity of the study. Further, the study only collected responses from technology firms where knowledge brokerage activities are more prevalent. Future researchers are recommended to conduct similar studies in other industry sectors, such as services and plantation. Besides, the study generally identified knowledge sources where new business opportunities can be recognized. Future researchers may identify specific knowledge sources in relation to specific business opportunities.

D. Conclusion

Entrepreneur's ambidexterity is difficult to achieve as it requires an optimum balance between two activities that are on the opposite sides. Meanwhile, it is crucial to identify its antecedents and consequences of managerial ambidexterity as well as the potential moderators and mediators affecting the relationship between managerial ambidexterity and entrepreneurial performance. This study hopes to contribute to the managerial ambidexterity literature by examining environmental dynamism and social network as the antecedents to ambidexterity and proposing knowledge brokerage as a mediator between entrepreneur's ambidexterity and firm performance. Besides, entrepreneurs may benefit from this study by recognizing the roles played by knowledge brokerage activities in enhancing their business performance.

ACKNOWLEDGMENT

The research project is funded by the Fundamental Research Grant Scheme (FRGS), Ministry of Higher Education, Malaysia (FRGS/1/2014/SS05/UNIRAZAK/02/1).

REFERENCES

[1] Kirkels, Y., & Duysters, G. (2010). Brokerage in SME networks. Research Policy, 39(3), 375-385.

[2] March, J. G. (1991). Exploration and exploitation in organizational learning. Organization Science, 2(1), 71-87.

[3] O'Reilly 3rd, C. A., & Tushman, M. L. (2004). The ambidextrous organization. Harvard Business Review, 82(4), 74-81.

[4] Hargadon, A. B. (1998). Firms as knowledge brokers: Lessons in pursuing continuous innovation. California Management Review, 40(3), 209-227.

[5] Gibson, C. B., & Birkinshaw, J. (2004). The antecedents, consequences, and mediating role of organizational ambidexterity. Academy of Management Journal, 47(2), 209-226.

[6] Birkinshaw, J., & Gupta, K. (2013). Clarifying the distinctive contribution of ambidexterity to the field of organization studies. Academy of Management Perspectives, 27(4), 287-298.

[7] Verona, G., Prandelli, E., & Sawhney, M. (2006). Innovation and virtual environments: Towards virtual knowledge brokers. Organization Studies, 27(6), 765-788.

[8] Sheate, W. R., & Partidário, M. R. (2010). Strategic approaches and assessment techniques—Potential for knowledge brokerage towards sustainability. Environmental Impact Assessment Review, 30(4), 278-288.

[9] Duncan, R. B. (1976). The ambidextrous organization: Designing dual structures for innovation. The management of organization, 1, 167-188.

[10] Mom, T. J., Van Den Bosch, F. A., & Volberda, H. W. (2009). Understanding variation in managers' ambidexterity: Investigating direct and interaction effects of formal structural and personal coordination mechanisms. Organization Science, 20(4), 812-828.

[11] Tushman, M. L., & O'Reilly, C. A. (1996). The ambidextrous organizations: Managing evolutionary and revolutionary change. California management review, 38(4), 8-30.

[12] Lewin, A. Y., Long, C. P., & Carroll, T. N. (1999). The coevolution of new organizational forms. Organization Science, 10(5), 535-550.

[13] Gould, R. V., & Fernandez, R. M. (1989). Structures of mediation: A formal approach to brokerage in transaction networks. Sociological Methodology, 89-126.

[14] Burt, R. S. (2004). Structural holes and good ideas. American journal of sociology, 110(2), 349-399.

[15] Jansen, J. J., Van Den Bosch, F. A., & Volberda, H. W. (2005). Managing potential and realized absorptive capacity: how do organizational antecedents matter?. Academy of Management Journal, 48(6), 999-1015.

[16] Heavey, C., Simsek, Z., & Fox, B. C. (2015). Managerial social networks and ambidexterity of SMEs: The moderating role of a proactive commitment to innovation. Human Resource Management, 54(S1), 201-221.

[17] Raisch, S., & Birkinshaw, J. (2008). Organizational ambidexterity: Antecedents, outcomes, and moderators. Journal of Management, 34(3), 375-409.

[18] Junni, P., Sarala, R. M., Taras, V., & Tarba, S. Y. (2013). Organizational ambidexterity and performance: A meta-analysis. Academy of Management Perspectives, 27(4), 299-312.

[19] Dess, G. G., & Beard, D. W. (1984). Dimensions of organizational task environments. Administrative Science Quarterly, 29, 52-73.

[20] Collins, C. J., & Clark, K. D. (2003). Strategic human resource practices, top management team social networks, and firm performance: The role of human resource practices in creating organizational competitive advantage. Academy of Management Journal, 46(6), 740-751.

[21] Strasser, S. et al. (1981). Conceptualizing the goal and system models of organizational effectiveness – Implications for comparative evaluation research. Journal of Management Studies, 18, 321-340.

[22] Dess, G. G., & Robinson, R. B. (1984). Measuring organizational performance in the absence of objective measures: the case of the privately-held firm and conglomerate business unit. Strategic Management Journal, 5(3), 265-273.

[23] Sanchez, G. (2013). PLS path modeling with R. Berkeley: Trowchez Editions.

[24] Cohen, J. (1988). Statistical power analysis for behavioural sciences (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum.

[25] Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G* Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. Behavior Research Methods, 39(2), 175-191.

[26] Nunally, J. (1978). Psychometric. McGraw-Hill, New York.