

Developing networks for resource acquisition during the start-up and early growth stages: exploring the experiences of female entrepreneurs in technology-based firms in Jordan

Wejdan Alakaleek, Doctoral Researcher, Centre for Entrepreneurship Research, University of Edinburgh Business School, The University of Edinburgh, 29 Buccleuch Place
Edinburgh EH8 9JS, w.alakaleek@sms.ed.ac.uk

Sarah Cooper, Professor of Entrepreneurship and Enterprise Development, Centre for Entrepreneurship Research, University of Edinburgh Business School, The University of Edinburgh.

High Technology Small Firms Conference, University of Groningen, June 4&5, 2015

ABSTRACT

The research reported in this paper sought to explore how Jordanian female entrepreneurs in technology-based firms engage in networking for firm establishment and growth. The work investigates the network structure and its content in a Middle Eastern society where there is an absence of studies which have been undertaken in such an environment. Findings are reported from the qualitative study which used in-depth interviews with the female entrepreneurs who had founded 14 technology-based firms, to investigate aspects which include the nature and content of the network ties through the firm development process. The study reveals some differences in the Jordanian case from findings obtained from studies of western female entrepreneurs, particularly in terms of the type of actors who were utilised to access resources and support at different points in the business development process.

INTRODUCTION

The encouragement of women-owned entrepreneurial firms has become a tool to help achieve more economic growth and address high levels of unemployment (McGowan et al., 2013), particularly, in areas which add value to society's economic development, such as technology sector (Hampton et al., 2011). Opportunities are greatest where current economic participation by women is low: Jordan is characterised by its low levels of women's economic involvement both as business owners and employees (USAID, 2007; IFC and CAWTAR, 2007; Peebles et al., 2007). In Jordan, 5.3% of businesses are owned by women (MPIC and UNDP, 2011) and during the fourth quarter of 2014 the unemployment rate has reached 19.1% for females compared with 10.9% for males (JDS, 2015). These participation rates are below expectations as the country has a good level of economic development (Stevenson et al., 2010).

The country has a significant opportunity to take advantage of its highly educated young population, particularly women, to increase their participation in economic activities as an effective strategy to achieve benefits at both micro and macro-economic levels (Stevenson et al., 2010). Official figures in 2012/2013 reflect that the number of females pursuing higher education reached 51% of the student population. In the same year the percentage of women who graduated from science, computer science and engineering programmes constituted 48% of the student population (MHESR, 2013). Despite the fact that around half of the graduates, particularly from Information and Communications Technology (ICT) programmes are female, they represent only approximately one-third of total employment in the ICT sector (Al Jidara, 2014). Thus, one of Jordan's important challenges is empowering women, especially in economic life, such as encouraging their greater engagement in the workforce.

Broad agreement exists about the key contribution that entrepreneurial activities can make to economic development and job creation (Robb and Coleman, 2010; Wennekers and Thurik, 1999). Increasing the prevalence of entrepreneurial activities is one of Jordan's significant

opportunities, where an investment in developing a more entrepreneurial culture among young people and facilitating would-be entrepreneurs' entry and growth, especially among women, could bring significant benefits to the country. Business formation is the result of a combination of the entrepreneur's motivation and access to the necessary resources which enable him/her to exploit a viable opportunity (Aldrich, 1989). Factors which influence the supply of entrepreneurial talent, as well as the supply of and access to key resources, will therefore have an impact on the number of firms established and the level of development and growth achieved.

Female entrepreneurs starting firms in Jordan usually do not have sufficient internal resources to guarantee the successful formation and growth of their ventures. Securing access to external resources is vital to allow entrepreneurs to achieve more successful business development (Steier and Greenwood, 2000; McEvily and Zaheer, 1999). Network ties are seen as an effective source or route through which the entrepreneur is able to reach and obtain the resources (Dubini and Aldrich, 1991) necessary to assist the firm through its various stages of development (Martinez and Aldrich, 2011; Grave and Salaff 2003; Hite and Hesterly, 2001).

While there is a growing body of research-based literature on entrepreneurial networks, the networks and networking activities of female entrepreneurs have attracted very little attention (Hampton et al., 2009), with a marked absence of studies from the Middle East. Understanding more about how Jordanian female entrepreneurs engage in networking for firm creation and growth should help inform theory by identifying their model of network development, and how they compare with western-developed frameworks, as well as supporting development of policy and practice targeted at enhancing the entrepreneurial environment. This research, therefore, provides a contribution to knowledge through exploring how Jordanian female entrepreneurs' network ties develop to provide advantage in resource acquisition during the early development stages of their technology-based firms.

CURRENT PERSPECTIVES ON NETWORKS AND NETWORKING

Analysing the role of entrepreneur's network ties in resources acquisition requires developing a good understanding of how entrepreneurs build their network ties to achieve more successful formation and growth (Ozdemir et al., 2014; Martinez and Aldrich, 2011). Resource acquisition is one of the biggest challenges that entrepreneurs face in the early stages (Sullivan and Ford, 2014): entrepreneurs lack internal resources, which makes them need others' help to reach and obtain resources externally (Marion et al., 2015). A wider range of inputs, from financial and physical resources to information and symbolic support, are required by the entrepreneurial firm (Kanter, 1984), thus, during the entrepreneurial process entrepreneurs need different types of network structures to secure avenues to these different resources (Elfring and Hulsink, 2007). Each structural dimension of an entrepreneur's network represents a key source of entrepreneurial content (resources) (Hoang and Antoncic, 2003). For example, if the entrepreneur needs new information, then weak ties are more beneficial than strong connections (Martinez and Aldrich, 2011; Granovetter, 1985).

Analysing the entrepreneur's network structure and its content provides a deeper understanding of the entrepreneur's network (Slotte-Kock and Coviello, 2010) and its role reaching and acquiring resources (Lechner and Dowling, 2003), helping explain who the entrepreneur reaches, how they reach out (structure) and what they reach out for (content) (Burt, 1992).

Network structure

Network structure focuses on analysis of network characteristics and is described as the 'pattern of direct and indirect ties between actors' (Hoang and Antoncic, 2003, p. 170). It reflects the

entrepreneur's structural position within the network (Burt, 1992), which in turn, contributes to determining the extent and range of the accessible and obtainable resources (Moran, 2005; Borgatti and Foster, 2003). Network structure has a crucial role in explaining the individual's ways of utilising the network to reach a specific goal (Granovetter, 1973), particularly, in creating and growing new firms (Hite and Hesterly, 2001; Larson and Starr, 1993). Several structural characteristics within the network-based literature have been employed to describe the presence or absence of the relationships between the network actors (Hoang and Antoncic, 2003, p. 166), including: diversity, density, reachability (Dubini and Aldrich, 1991), centrality (Freeman, 1979) and strength of ties (Granovetter, 1973).

The strength of network ties describes the attributes of the ties (Dubini and Aldrich, 1991; Granovetter, 1973), which are measured within the literature by using the frequency, intensity and duration of the interactions (Capaldo, 2007). Earlier studies considered, also, the degree of closeness (Sullivan and Ford, 2014; Kontinen and Ojala, 2011; Jack et al., 2004), trust (Söderqvist and Chetty, 2013; Jack, 2005), knowledge, familiarity (Jack 2005) and commitment (Söderqvist and Chetty, 2013; Rowley et al., 2000) as the main attributes influencing the degree of strength of the entrepreneur's ties. *The network diversity* dimension reflects the degree of heterogeneity within his/her network (Witt, 2004) and depicts the extent of resource variety that is available to the entrepreneur (Aldrich, 1989). Diverse contacts from which to ask for advice; help and resources are considered to be more valuable to the entrepreneur for their businesses (Witt, 2004; Hoang and Antoncic, 2003; Aldrich, 1989). To determine the diversity of the entrepreneur's network, studies have used types of relationships with actors (Witt, 2004) and the gender of those actors (Hampton et al., 2011).

Network reachability exists when there is a path which links the entrepreneur, through his or her network ties, with another actor with whom they are not connected directly (Dubini and Aldrich 1991; Aldrich 1989). Under this dimension, network actors can be ranked 'by how many intermediaries a path travels before one person is indirectly linked with another' (Dubini and Aldrich, 1991, p. 310). *Network density* describes the extensiveness of ties between the actors within his/her network (Dubini and Aldrich 1991). It reflects to the degree to which the actors within the entrepreneur's network are connected to each other (Hampton et al., 2011; Martinez and Aldrich, 2011). Finally, the structural dimension of *network centrality* reflects the central position that the entrepreneur occupies within the network, describing 'betweenness' or the ability of the entrepreneur to be a broker between their network ties (Freeman, 1979).

Network content

Network content reflects the function of the network ties (Jack et al., 2004; Lechner and Dowling, 2003), where this line of investigation focuses on explaining what entrepreneurs can acquire through their network ties (Borgatti and Foster, 2003). Entrepreneurs' network ties directly affect the entrepreneurial process through creating a pathway to access different resources present in the ties (Hite 2005). For example, network ties with suppliers, customers, competitors and technical experts are vital for accessing specific market information, new product ideas (Jack et al. 2004) and know-how (Powell, 1990). Under this condition, network ties offer a lot of benefits to the entrepreneur as they represent media for exchanging and creating bridges to other individuals and firms (Powell, 1990). Studies indicate that successful entrepreneurs who have high quality of ties can gain better accessibility to what they need for their venture creation and development activities (Borgatti and Foster, 2003).

The content (resources) which entrepreneurs can obtain and access through their network have been summarised within the literature as: human capital in the form of knowledge and information (Semrau and Werner, 2013; Johannisson, 1998; Coleman 1988), financial capital

(Hanlon and Saunders, 2007; Steier and Greenwood, 1999), establishment of firm legitimacy (Batjargal, 2010; Moensted 2010; Brass et al. 2004) and building other networks (Soderqvist and Chetty, 2013; Semrau and Werner, 2013; Martinez and Aldrich, 2011). As such, network ties embed many resources important to the entrepreneur (Jack et al., 2004; Lechner and Dowling, 2003) as they represent a tool for exchanging and creating bridges to other actors, including individuals and firms (Powell, 1990).

Network evolution

The basic argument is that the resources which the entrepreneur requires and their acquisition challenges change through the business development process (Hite and Hesterly, 2001). From this perspective, the entrepreneur's network ties need to be developed to correspond with changes in the firm's resource requirements (Sullivan and Ford, 2014; Grave and Salaff 2003; Hite and Hesterly, 2001). Entrepreneurs have to maintain and adapt aspects of their network's structure (Hampton et al., 2011) continually to try to connect with new ties to gain new resources and sustain their firms' growth (Rivera et al., 2010; Hansen, 1995). Each stage of the new firm development process is differentiated by performing activities in which the entrepreneur's network ties play a vital role (Martinez and Aldrich, 2011). For example, during the very early stage, strong social ties affect directly the individual's initial intention and motivation towards entrepreneurial activities (Martinez and Aldrich, 2011).

In describing the dynamic network process, the structural model develops to reflect changes in the overall network (Hoang and Antoncic, 2003). According to this model, the composition of the entrepreneurial network evolves continually to adapt to the venture's changing resources needs and acquisition challenges (Siu and Bao, 2008; Greve and Salaff, 2003; Hite and Hesterly, 2001). This model reflects that the entrepreneur's network ties develop through time from an unplanned network to a planned and more calculative network (Grave and Salaff 2003; Hite and Hesterly, 2001). In the entrepreneurial network literature, the changing structural characteristics of the entrepreneur's network have been examined through different stages of the business life cycle (Martinez and Aldrich, 2011). These stages mostly include: the prior start-up, start-up and early growth stage.

Within the female entrepreneurship literature, very few studies have examined the role of the female entrepreneur's network in the firm development process, and all are Western-based. Hampton et al., (2011) and (2009) examined the development of quality in the female technology entrepreneurs' network. Their findings show that female technology entrepreneurs achieved greater quality of network relationships as their firm grew to become more established businesses. They suggest that higher levels of industrial experience possessed by some female entrepreneurs enabled them to enhance the level of network quality. Those studying the process of entrepreneurial network development conclude that there are gender differences in the sex composition of female entrepreneurs' networks, particularly, in the earlier stages of the venturing process, but these differences decrease in the later stages (Hampton et al., 2009; Klyver et al., 2007).

Studies which investigate the structure of female entrepreneurs' network are limited in number, but include Hampton et al., (2011) and McGowan et al., (2013); however, the network content of structures as a variable of analysis is absent from these studies. The current research seeks to address this gap. The purpose of this research, therefore, is to explore the network model of the female entrepreneurs in a male dominated sector, in an unstudied Middle Eastern context. In addition, it aims to provide a better understanding of how female entrepreneurs' networks develop through time offering an holistic analysis of their networks' structure and content utilised for firm creation and development.

RESEARCH METHODOLOGY AND DESIGN

Research context

The research focus is on female entrepreneurial firms in the early development stages due to the high probability of engaging in networking activities and building a network for developing the business during this time, (Sullivan and Ford, 2014; Hite, 2005; Hite and Hesterly, 2001) where the entrepreneur represents a hub of his/her own firm (Johannisson, 1998). Building on this, Jordan's technology sector was chosen given its level of physical and intellectual development witnessed recently, attracting 50% of the country's start-ups and many foreign investments (Intaj, 2013). Many opportunities are emerging, especially, in the ICT sector, due to several factors such as liberalisation of telecommunications, increasing infrastructure accessibility, increases in government support and the creation of a good regulatory ICT framework (Al Jidara, 2007). The country also has made many regulatory reforms to make business registration for entrepreneurs easier and cheaper (World Bank, 2013). These developments have helped make the country one of the more desirable places to launch technology start-ups in the region¹, which is described as the haven of the region's entrepreneurs due to development of its entrepreneurial ecosystem (FYGL and BC, 2011). This suggests that the country's technology sector is a positive environment for entrepreneurship and offer the possibility of finding female entrepreneurial firms in early development stages.

Research approach

The exploratory nature of this research considers the qualitative methodology as appropriate (Blaikie, 2009; Miles and Huberman, 1994) using a two-stage, in-depth interview approach to address the research questions. Literature argues that studies which adopt a qualitative approach are better placed to provide a richer understanding of entrepreneurial networks, particularly those process-oriented network studies (Jack, 2010; Hoang and Antoncic, 2003). The use of multiple in-depth interview stage increased the ability to review and confirm the data with the participants and better coverage to the research questions.

Research sample

Fourteen female entrepreneurial firms were selected from Jordan's technology sector. The women were chosen for interview on the basis of several conditions that have theoretical and empirical importance for this study. All the female entrepreneurs owned, created and managed technology-based firms and they had hired their first employee and (or) sold their first commercial product/service (Table 1 provides further details of the research participants). The female-owned technology ventures in this research range from the start-up to early growth stage: all had operated for less than seven years. These ventures represented different technology areas, including software, animation, digital content, mobile applications, web services, engineering activities and technical consultancy, technical testing and analysis, electronic device and ICT consultancy. The participants' age when they started their business ranged between 23 and 49 years, and most of them had related prior experience.

Research analysis

Analysing and eliciting the essence of a huge amount of data represents the main issue in the qualitative data analysis (Patton and Patton, 2002). This requires a process of dividing the data into subgroups according to a logical system to facilitate the process of data analysis (Whittemore and Knafl, 2005). Reducing the amount of raw research data involves a process of data 'selecting, simplifying, summarising and transforming' (Miles and Huberman,

¹ Considering criteria such as the legal environment, availability of infrastructure and the entrepreneurship spirit and talent, Jordan's capital Amman has ranked recently as one of the top world cities to launch a tech start-up. This ranking was developed by the founder of a venture capitalist firm, Rachid Sefrioui and his team (<http://rachid-sefrioui-venture-capital.blogspot.co.uk/2012/01/top-10-cities-to-launch-tech-startup.html>).

1994:10). This process of data reduction helps to sharpen and manage the data in a way which facilitates conclusion drawing and verification.

Table 1: The characteristics of the research participants

Firm	Age of founder at start-up	Education level	Pre-entrepreneurial experience (same or relevant field)	Firm age: Year (month)	Participant's start-up²
F1	23	Bachelor	Yes (No)	4	Incubatee entrepreneur
F2	23	Bachelor	Yes (Yes)	1 (5)	Independent entrepreneur
F3	30	Bachelor	Yes (Yes)	2	Incubatee entrepreneur
F4	39	Bachelor	Yes (No)	7	Incubatee entrepreneur
F5	35	Bachelor	Yes (Yes)	1 (7)	Independent entrepreneur
F6 (a)	29	Bachelor	Yes (Yes)	8	Incubatee entrepreneur
F6 (b)	29	Masters	Yes (Yes)	6	Independent entrepreneur
F7	44	Bachelor	Yes (Yes)	6	Independent entrepreneur
F8	35	Masters	Yes (Yes)	1(10)	Incubatee entrepreneur
F9	49	Masters	Yes (No)	2	Incubatee entrepreneur
F10	30	Bachelor	Yes (No)	2	Incubatee entrepreneur
F11	30	Bachelor	Yes (Yes)	3(2)	Incubatee entrepreneur
F12	37	Bachelor	Yes (No)	2	Independent entrepreneur
F13	32	Bachelor	Yes (Yes)	4	Incubatee entrepreneur
F14	30	Bachelor	Yes (Yes)	4	Incubatee entrepreneur

When the data were collected the research interviews were taped, transcribed and then analysed to determine the categories and themes. The data were analysed by using open coding, which has been facilitated through use of the NVivo data analysis tool. Thus, initial themes from the data were generated to understand the networking activities of the Jordanian female technology entrepreneurs. These themes were then clustered into nodes which helped connections to emerge, pointing to core insights around key themes of network structure, content and process. The research focuses on analysing the female entrepreneur's ego network: the analysis is presented at the level of the founder and her ties to others (individuals or firms) (Witt, 2004).

² This research defines incubatee entrepreneurs as those female entrepreneurs who had been incubated in any organisation at any time of their business life. Independent entrepreneurs are those entrepreneurs who had not been involved as an incubatee in any type of incubator.

RESEARCH FINDINGS

Framed within the resource acquisition view (Pfeffer and Salancik, 1978) and answering the calls to clarify the quality of the female entrepreneurs' network (Hampton et al., 2011), this study provides insights into the development of the network that Jordanian female entrepreneurs configure for their technology-based firms in the early development stages to access and obtain the necessary resources. Evidence is presented as to how changes in aspects of network structure, including diversity, reachability, density, centrality and the presence of strong and weak ties, yield different types of content (resources) which are available to the entrepreneurs. How the female entrepreneurs' network model for resource acquisition develops will be presented in the next section.

Structure and content of the start-up stage network

Network structural characteristics: The participants' start-up network ties were dominated by relying on business ties, which included business organisations and accelerators, mentors, professionals, business partners, other entrepreneurs and entrepreneurship competitions. Personal network ties of those female entrepreneurs, family, friends and previous work colleagues, were present in the start-up network; however, the start-up network which they built to start and grow their business was characterised by its limited extent. Moreover, these personal ties appear to be unimportant in terms of obtaining and accessing the necessary resources to implement and sustain the entrepreneurs' business opportunities. F2 claimed: *'Our relationships were attached to work, so, when I started they were excited and they really encouraged us to start, but they didn't get me clients or connections or even give advice'*. The majority of start-up network ties were configured from small groups of business ties, which were predominantly male. F1 commented: *'My network when I started, it was more like engineers and entrepreneurs were related to technology, so, I used to ask and to have connections with people in these areas'*.

The dominance of a small group of business ties and the limited extent of personal ties affected directly the level of network diversity of these female entrepreneurs. It appeared that the female entrepreneurs utilised different business ties, however, the number of ties of each type was limited, which decreased the degree of diversity in the network. On the other hand, there was a high degree of interconnectedness evident among these actors within either the business or personal ties, generating a high level of density. Social knowledge increased with the higher levels of interconnectedness among personal ties: however, the level of general and direct knowledge increased with the presence of links among business ties. F10 explained: *'There is a lot of support for a women. So, those organisations go to [accelerator X] and presented themselves and [accelerator X] started to contact all the women tech entrepreneurs'*.

An important similarity among the female entrepreneurs was in terms of the lack of business impact resulting from their personal ties, which was affected by the strength level of these close family ties. For example: *'They gave more normal support but not in business. Like my husband and my father they're a really big support, but they didn't actually add value to the business itself'* (F10); *'they gave moral support, I mean, more emotional support, not financial or technical support, it's more emotional support'* (F9); *'no help, they listen to me only ... honestly, their support was more emotional support'* (F13). In its place, the start-up stage networks included strong new business ties, which appeared to be more important for obtaining real benefits. These started as weak ties and then developed to be strong ties through the start-up and early growth stage. F3 commented on her relationship with a CEO: *'It started formal, yes, but it turned to friendship, because of how frequently we talked about work and he did offer and support a lot'*. Building new strong ties with some of these business ties was

facilitated by developing a level of knowledge, high quality business interactions, trust and mutual respect and support.

At this network evolution stage, reaching out to others through different formal business network ties was limited, as very few relied upon others to gain access to contacts/resources when they first started. Entrepreneurship organisations and accelerators were the main source to reach through for those incubatee entrepreneurs. For example, F9 commented: *'I'd never meet the guy before, when I started I was introduced to him by [accelerator X], so, I asked if you could mentor, I mean, be one of my mentors'*. Business partners, firms within the industry, formal events or entrepreneurship competitions were the main vehicles to reach through for those independent entrepreneurs. A comment from F8 explained this: *'When I started because I was working with the contact list of [X], my business partner, he would introduce me to many clients or potential clients ... it was important at the beginning, I mean, if he didn't introduce me, I would not get projects'*.

The content of the network structural characteristics: The start-up network structure which was built around professional business ties, which were dominated by men and newly built strong ties, provided different content which included human capital, financial resources and legitimacy. The participants also benefited from their personal ties given that these personal ties were the main source of emotional support, extra pairs of hands and learning about human resources.

Financial resources: The analysis indicated that most of the participants, in twelve out of the fourteen firms, obtained different kinds of financial resources from their business ties. Although acquiring financial resources for some participants was not the main motivation to rely on business ties, for the other participants utilising these ties to find the financial funds that they lacked and needed at the start-up stage was a primary objective. For example: *'Actually, I depend on the competitions and grants because it was the only way that I can use at that time'* (F1).

These financial resources were in form of: seed fund investments: e.g.: *'They financed, um, [X company] put ten percent of the company and they paid for it'* (F3); cash support: e.g.: *'He [business partner] helped us with a bit of cash, cash flow until we got payments'* (F8); prizes: e.g.: *'The thing that we get started after I won the [X] competition and we got the first funding from this competition, and then we get started'* (F1); awards: e.g.: *'I got twenty thousand dollars as an award from [X Firm]'* (F5); or grants: e.g.: *'There are some donor agencies or projects in Jordan, [X], for example, that I took some money from [X] to finance the first batch of [the product]'* (F4). The sources of these financial funds were business partners, accelerators or business and enterprise development organisations.

'Newness' legitimacy: Legitimacy and business idea validation was another content that those participants obtained through their network ties, where the business network was the main source that those female entrepreneurs relied on to validate their business ideas. F13's comment reflected this: *'For example, [X], she is an American blogger ... she wrote about our applications, there is other group who are interested in the tech entrepreneurs, they were very interested in our firm ... especially Arab technology pioneers ... they actually caused a big promotion and all of them came through my posts in Twitter'*. Some female participants obtained 'newness' legitimacy through participating in entrepreneurship competitions and events which were run by some enterprise organisations or firms within the industry. A comment from F2 reflected this: *'We got famous! Everyone got to know our work, our style ... even, [X], the founder of [Y firm], he always says, like, who are you? You got famous and all people were talking about us, because wherever we went, we were winners and many people and organisations invited us to events and conferences'*.

Human capital: Human capital emerged within the data as one of the main contents that the female entrepreneurs obtained through their start-up network ties. The across-case analysis showed that the business network ties were, also, the main source of the participants' human capital. Human capital is 'embodied in the skills and knowledge acquired by an individual, which is created by changes in persons that bring about skills and capabilities that make them able to act in new ways' (Coleman, 1988, p. 100). The data suggested that different kinds of skills and knowledge were sought out from the female entrepreneurs' business ties.

Skills acquisition: Entrepreneurial skills were the main type of skills which appeared across cases, and were obtained mainly from the ties that they built with different business organisations: these skills helped to enhance the human capital of these female entrepreneurs. The data showed that even the independent female entrepreneurs searched for help from different business organisations to help develop these entrepreneurial skills. For example: F2 stated: *'Six months ago, I felt that in the part of, or in the side of creativity I'm doing very well, but businesswise wise, no, I do not have this skills or structure to my business ... so, I went to [accelerator X] bootcamp and I learned everything, honestly, in terms of business models, how you can focus on your target audience and all these thing related with sales forecasts and so on ... I attended this bootcamp and I stopped, I don't want investment'*.

Acquisition of advice: The data show different kind of advice which the female entrepreneurs received from their business ties, which came in the form of: business-related advice and product/service development advice. Advice included receiving different types of counsel, tips and guides about different businesses, input on product/service development, business ideas, business development and technology-related issues. These issues included: market research, finance, human resources management, business plan development and dealing with business situations and challenges. For example: *'He is a web developer; he gave me advice about the web content'* (F10); *'some bloggers helped us ... like questions and answers, I would ask and anyone may answer, for example, I used to ask about a specific theme or artist or I am confused about something'* (F13); *'advice about the business, like, in marketing, um, strategy, because he is heading a company that supports start-ups'* (F3).

Information acquisition: the analysis across cases indicated that the participants enhanced their knowledge by receiving different kinds of information through their business ties. The types of information were varied, and included information about the industry and new sources of resources, as well as information about entrepreneurship and networking events. F3 commented: *'In Twitter I used to ask so many questions and two people I remember very well were kind enough to send me reports. One of them he is [X], he is the founder and the manager of research group called [Y]. Another person is [W] and he is a manager, works with the VC fund, so he does [have] access to a lot of information and reports about the industry'*.

Learning: a common theme emerged across cases about the types of learning achieved by the female entrepreneurs through their dealings with different business ties, including: learning through other's experience and teaching. Learning from other's experience included learning new strategies, finding solutions, sharing ideas and information through being involved with other actors. For example: *'I was asking like, if they had investment or if they didn't had investment, how did they get it'* (F8); *'we were sharing the problems that we face ... it was good to see, like, yes, you're facing the same problem, yes, its normal this is what's supposed to happen'* (F10). Learning through teaching also helped some participants to build their knowledge: F14's experience with an organisation reflected this: *'There is [X] a consultant service, they give support for female entrepreneurs, they do a business plan and it is more focused on the market research, ... from them I learned how to develop a business plan in a professional way'*.

The analysis, therefore, demonstrated that the female entrepreneurs' start-up business network ties were the main source of obtaining human capital. In fact, human capital particularly knowledge represented a pervasive thread through the data as a common content from most start-up network structures. The analysis found that although the male-dominated ties reduced the start-up network diversity of those female entrepreneurs, the across-case analysis showed how these network ties were a source of obtaining human capital, particularly knowledge. The majority of ties with the mentors, other entrepreneurs, managers, CEOs, business partners and professionals that formed the business ties and appeared important in providing advice, information and teaching, were with men.

Although the extent of reachability through different indirect ties was limited a common theme, which emerged through the analysis of those indirect ties in the start-up network, indicated that they were a source of human capital, mainly knowledge. F9 summarised: *'but I've been through the mentorship programme that they have, I mean, I went and I met many other entrepreneurs and mentors who have been there, done that, who basically give advice'*. Thus, this research suggests that human capital (knowledge) was the main content of the indirect start-up ties which were used to measure reachability in the current research.

A high level of density was apparent among the members of their personal ties as well as their business network ties, both of which were important sources for obtaining knowledge. Density among the business ties particularly supported learning from others' experiences, through sharing information and ideas. The following comment made by F2 reflected this: *'The most beautiful things in our community is that all the CEOs and people are always available online and they answer and they talk and they give you their time, and if you want anything just call us. Actually, we all follow each other with the update, and the thing that I like to talk to them about is my problems, why? Because we are facing the same problems and challenges'*.

Some participants indicated the important of these dense business ties in facilitating obtaining advice. F1 stated: *'My networks during the period when I started ... it was more like engineers and entrepreneurs were related to technology, so, I used to ask ... people in these areas, those people who have experience related to my experience'*. On the other hand, facilitating learning about human resources was the main common content of the dense personal networks, particularly among the previous work colleagues. A comment from F14 reflected this: *'Sometime I want a freelancer and I want someone very good not just anyone, you know, you want to have high quality work, so you need a trusted person ... so, I used to ask the guys that I used to work with'*. As a result, the dense business ties facilitated obtaining advice and learning from others' experiences through sharing information. On the other hand, dense personal ties facilitated obtaining information about human resources.

Moral support: The analysis showed that the most common content that came from the participants' personal ties included: emotional support and an 'extra pairs of hands'. Emotional support came in forms of psychological support; satisfaction and pride in what those female entrepreneurs were doing and having a feeling that there were some people to listen and back them up during the business journey. For example: *'Moral support, I mean, more emotional support, not financial or technical support, its more emotional support, which gives you positivity, which gives you more energy to do whatever you're doing'* (F9). Extra pairs of hands appeared within the data in different forms, such as, when doing testing or experimenting for the products; and taking care of children and helping with routine tasks. For example: *'My father ... he used to help me ... which was very rare but sometime if I need him to come to the company and check on the work and employees or something, if I'm travelling he would do that'* (F10).

In analysing this kind of support, some respondents indicated that the emotional support, particularly from their families, increased as they proved their business ideas after the start-up stage. For example, F3's comment reflected this: *'At the beginning they did not think it's a good idea, I had a good job and they thought that it's better for me if I stay in my job, secure job, secure salary, social security. So, at the beginning they want me to stay in my job. But after I took the step and I started, they have become supportive, very supportive'* and she added: *'After I started and after I launched my website and got investment, they believed in it more and they have become definitely more supportive'*.

Structure and content of the early growth stage network

Network structural characteristics: The female entrepreneurs' networks evolved to include more business ties, network platforms and additional market ties, including clients, distributors, agencies and firms within the industry, as their firm grow. A comment from F8 explained the type of tie in the early growth stage: *'It has grown, yes, with time it has grown ... a lot, a lot, I have all my clients added as new networks, I have a lot of people that I have met, so it's a, it's an explosion ... so, clients, partners who work with ... people who introduced people to me or people who I met during events'*.

The development process of the participants' network implies that the variety of ties is dynamic in nature, developing through time to involve more business ties, market ties and networking platforms. In this sense 'although diversity provides advantage at the beginning of the of the entrepreneurial process, it appears to become more important as well as more common at later moments in the process' (Martinez and Aldrich, 2011, p. 24). Diverse structure includes a large proportion of weak ties, which are characterised by a high degree of formality and lack of knowledge of each other, with relationships associated with undertaking work.

Despite the fact that the density in those female entrepreneurs' networks decreased as they approached the early growth stage of network evolution, as more weak market ties entered their networks, the participants' use of the interconnected business industry ties continued. F9 explained: *'I'm still using [accelerator X's] network and I'm still using the contacts that I know, but it has grown ... the contacts increased with time definitely, because you get to be involved in many other activities and events and networks and groups and discussions that are related to the field, so, you start meeting new people and making new contacts and building on the previous ones, so, basically, when I first joined [accelerator X], most of the contact was with peer contacts, I mean, with other entrepreneurs and start-ups and the team of [accelerator X] themselves included CEOs, the investment officer, the mentorship programme and then gradually they started introducing me through the mentorship programme to the mentors who are based in Jordan and from there I've started to expand the network of contacts in this specific sector'*.

The evolution in the participants' network model, also, demonstrated that the network centrality of the participants appeared when their firms were their second venture. For these female entrepreneurs, being a broker for two other actors in their business network increased with greater network tie diversity, and as there was a shift from a focus on start-up requirements and challenges to an emphasis on developing their business model. F11 stated: *'I have started to connect others together now so I got to know people in other fields. When I started I knew people just in my field of work, in IT ... now, I know people in the field of IT and others, other entrepreneurs, CEOs, who are the investors in the market, which are the firms that we could collaborate with'*.

In the other direction, the number of actors who acted as a broker increased within those female entrepreneurs' network through time, providing greater opportunities to reach through to connect with different business and market network ties. The formal events and networking

platforms represented a significant gateway for those female entrepreneurs to build more business and market network ties. It appeared that both the independent and incubatee entrepreneurs benefitted from participating in the formal events. In increasing the reachability offered by their network ties through the firm formation process, participants pointed to three key conditions: proactivity in building relationships, maintaining relationship and network event attendance. F9 indicated the importance of being proactive in building relationship to secure access to new channels: *'It really depends on the entrepreneur himself or herself and how proactive they are, how ready they are to embark in this sort of the journey, how open they are to meeting new people, making new contacts, capitalising on the contacts that they have got ... the opportunities are there, the channels of communications between us and other networks in Jordan are available, but we have to be more proactive, we have to take initiative'*.

Network content: the content of the participants' early growth network is mainly focussed around building network ties, which facilitate and promote access to customers, access to potential and industry actors and access to firms within the industry that might provide new knowledge, new additional business contacts and offer opportunities for business exchange. In addition, it helped increase the diversity of participants' access and knowledge.

Building network ties with customers: The participants' market network ties, which were mostly weak ties, were a source of building network ties with customers. Although market ties were essentially exchange relationships (Martinez and Aldrich, 2011), these ties were also a source of facilitating access to additional customers. A comment from F8 reflected this: *'If some people work with clients and if they were happy with you, then, they will refer you to other people and then other people contact you to do their projects. So, we are getting clients in this way ... [X], he is a new client who basically introduces me to people, new clients'*. Some participants indicated other market ties' role in reaching new customers, for example, F3's comment on her tie with agencies and firms in the industry reflected this: *'Dubai is trying to bridge the gap between us and our market ... there are companies and agencies in Dubai who are trying to play a role in that'*.

The participants' business network ties in the early growth stage, also, were a source of building network ties with customers. A comment made by F3 reflected the benefit which came from her firm's investors: *'[investor] was introduced us to [Y company] and we are now, today, providing license and content to [Y company]'*. In fact, many of the business ties which were built at the start-up stage played another role, including acquiring access to customers, during the early growth stage. F13 commented on her tie with a professional: *'Through [X], for example, a month ago, someone asked her about companies doing games and apps in education ... and she gave him our firm's name, so, he phoned us'*. F11, also, commented on her firm's investor's role as: *'He introduced us to many people like potential clients, he helped us, also, to get to know people and they invited us to a conference and the fact that we were in this conference gave an opportunity for us to get to know people and lots of firms'*.

Building network ties with potential and industry actors: The networking platforms and events that the participants were a member of or participant in were a source of building network ties with potential and industry actors. The analysis indicated that the most common content that came from the networking platforms and events included promoting and facilitating connections with potential and industry actors which provided new knowledge, new additional business contacts and offered opportunities for business exchange. These actors within the industry that the female entrepreneurs met through events included experts, technology firms and industry investors. F12 commented: *'[A] month ago, there is a new cluster through [networking platform], they did an initiative to all technology companies in education, and they put us in touch with a group of government and private companies to see*

High Technology Small Firms Conference

how we can benefit each other. This was very beneficial because I got to know all the interested parties in technology and education’.

The networking platforms and events, in addition, facilitated access to many potential actors, which included either business or market ties: as F10 explained: *‘Lots of these things happen in events, through special events that companies they’re doing now like networking and mentor events, where you can see mentors and potential clients and potential people that can help you out. So, you introduce yourself and then you came back with a lot of contacts and later on you can contact them and see whether there is a potential opportunity, advice, investment or any kind of opportunities’.*

These actors that those female entrepreneurs met through events were potentially to become an active actor in their network, as F9 explained: *‘All these networking events, you develop contacts, you develop relationships, I go to, because I know these relationships will pay off in the future, I either benefit immediately from a question I could ask somebody who is an experts in something or you obtain this business card, write to them genuinely, maintain it and whenever, um, or something comes up in the future I go back to them and ask’.* Some female entrepreneurs indicated to how some actors they met through events became active members in their network to reach out through at a later stage. For example: *‘This is more related with events, when we go to events, for example, when we went to the Arab Content conference, [CEO] came and he introduced himself ... when he came to Jordan, we met and then he introduced us to investors, especially from Lebanon’ (F13).*

Building network ties with firms within the industry: Female entrepreneurs benefitted from the business ties at the early growth stage, firstly, to acquire access to firms within the industry that might provide business exchange opportunities. F3 commented on the benefit which came from her firm’s investor: *‘[investor] was introduced us to ... the managing director of [Y company]’.* Secondly, the introduction through business ties was, also, to firms whom they built business collaboration with later on. The following comment from F11 on her ties with an accelerator reflected this: *‘I got to know many start-ups through [accelerator X], for example, [Y start-up firm], I introduced them to [W organisation]. Recently there was a meeting and they started to work together ... also, I linked another start-up with a publishing house. Also, I linked [K], they are also start-up firm, with [W organisation] and reading clubs, because I know many of these clubs’.*

Therefore, the increased diversity and reachability of the female entrepreneurs’ network ties at this stage functioned mainly in building network ties, embedded new market knowledge and additional business and market contacts. This suggests that the main resource that those female entrepreneurs needed to build to grow their firms was building network ties. F3 summarised: *‘After starting up and moving on, I’ve been become less dependent on those mentors and more focused on building contacts with future partners and future investors. So, it’s become less around asking for advice because now I have my board and I ask them for advice and we put a strategy together and more with a strategy with the board, with investors and potential business relationships’.* Considering how her business requirement changed, F14 commented that: *‘I needed their network, enough I need the business to grow’.* Thus, the study confirms that the network ties entrepreneurs develop adapt in a way to provide the business with the necessary resources (Hite and Hesterly 2001).

Diversifying knowledge and network access: the decrease in network density in the participants’ early growth network is attributed to the increase in network ties diversity of those female entrepreneurs as new ties are added at this stage. The lower level of connection among these actors in the female entrepreneurs’ early network helps to diversify types of knowledge and access. Some of the female entrepreneurs indicated that the low level of interconnectedness

among people that they met, especially in events, helped them to diversify and broaden their knowledge. A comment from F3 reflected this: *'Networking events and they helped me to get contacts with different persons, they give you insights, they give you, um, they let you know about new markets and what are their international trends and you sort of get benchmarks against companies who have made it in their part of the world and try to follow their steps'*. Some other females focussed on the important of diversifying access to new actors who might provide real benefits. F10, also, stated: *'When I attend these events, as I mentioned, there are a lot of connections there and networking to do, these connections benefitted the company a lot, they pushed the company further'*. Thus, this research suggest that the low network density in the early growth network of the Jordanian female entrepreneurs provides a means of diversifying knowledge and access.

In addition, the analysis indicated that network centrality increases the likelihood of getting access to new actors who could provide resources or open doors to new business opportunities. The following comment by F6 explained this: *'I just met someone very interesting who has a multilingual apps and his whole, um, the whole vision of his company is very similar to ours and I found so much synergy with this guy ... he is a hugely successful consultant, he spent tens of millions of dollars spending in his business and he is very interested in sharing our content ... I connected him with my distributor because he needed a distributor and he has very strong connections with the material network, so, we helped each other out, I introduced him to my distributor and he introduced me to, well, he hasn't yet, but he will, we speak with each other'*.

DISCUSSION

One of the study's important contributions is to have explored the network development model of the female entrepreneurs in technology-based firms in Jordan as there has been a lack of previous studies examining the networking behaviour of female entrepreneurs in Middle Eastern societies. In addressing their network evolution from the start-up into the early growth stage, the research revealed the dynamic nature of the network structure, with marked changes in structural characteristics and the types of content they provide. The model at the start-up stage is characterised by using business ties established within male-dominated networks, building new strong ties involving a high degree of interconnectedness between network ties, and benefitting from a limited number of indirect ties through which to reach out to others. These start-up network structural characteristics enabled the female entrepreneurs to obtain and reach human capital, financial resources and cultivate legitimacy.

The network structure of the female entrepreneurs as their firm moves into the early growth stage changed, so that it became characterised by a higher level of diversity in terms of types of tie; the network continued to be dominated by male ties, but there was a growing number of weak network ties, which reduced network density. The women also benefitted from more indirect connections reaching ne connections through others in their network and they started to broker relationships for others in their network. The research revealed that the structural characteristics of the early growth network helped those female entrepreneurs in building network ties with market knowledge sources, market actors including buyers, other firms within the industry and distributors.

The structural model indicated that the entrepreneurs' network ties developed through time, from an unplanned network which was dominated significantly by social ties to a planned and more calculative network, with greater market and business-based ties (Grave and Salaff 2003; Hite and Hesterly, 2001). In the entrepreneurial network development literature, the personal ties including the family, friends and previous work colleagues appeared to be the main network actors for the entrepreneurs at the start-up stage (Semrau and Werner, 2014; Hampton

et al., 2009; Lechner and Dowling 2003; Hite and Hesterly 2001; Larson and Starr, 1993). These network development models indicated the importance of these ties at the start-up stage for providing different kind of resources and support, including start-up financial capital, knowledge and new additional business contacts (Semrau and Werner, 2014; Jack, 2005; Jack et al., 2004; Steier and Greenwood, 1999; Larson and Starr, 1993). Despite some recent studies' findings which have pointed to the increasing role of business ties at start-up, personal ties with previous work colleagues (Soderqvist and Chetty, 2013) and family, were still recognised as most important for entrepreneurs in securing new resources (Elfring and Hulsink, 2007).

An important finding of this research, however, is that the development network model of the participants appears to be much more planned, and is dominated by business-based ties from start-up through to the early growth stage. The personal ties are utilised much less and were replaced by using business-based ties. The findings revealed that changes in the resources needed during the firm life cycle were the main drivers of development of the female entrepreneurs' network ties and defined who to include in their networks. This suggests that the cases focussed on this this research cases were more management-oriented in the process of building their network for firm creation and growth.

In this research, it is clear that a lack of the necessary knowledge and resources amongst their personal ties, who were mostly outside business or technology environments, was one of the most important factors which pushed those entrepreneurs to rely on new types of tie. F3 commented on her friendship ties: *'My friends, they're employees most of them, so, I think ... there is a gap between us, it's difficult for them to understand what I go through every day at work'*. Similarly, F1 commented on her search for start-up financial resources: *'Actually, I depend on the competitions and grants because it was the only way that I can use at that time'*. Within the literature there are two options for the entrepreneurs who have strong personal ties which do not provide direct or indirect access to the required resources: first, use the friends and acquaintances of their personal ties (Jack, 2005); second, participate and use industry events to obtain access to the knowledge sources and industry actors (Elfring and Hulsink, 2007). This access through events gives entrepreneurs an opportunity to build new ties and, through time, large number of these new ties will drop and some of them will become strong trusted ties which play a vital role in securing resources (Elfring and Hulsink, 2007). In the case of the female entrepreneurs studied, the new well-connected start-up business ties do appear to provide good level of resources, and as their firms move into the early growth stage the networking events start to play an important role in developing additional business and market ties.

Findings of this research suggest, also, that the participants have a relatively sound understanding of the work environment and have a strategic perspective on what is beneficial to their start-ups. This appeared clearly in the way they searched for business resources, where the requirements of the business were the motivation to build connections and determined who was included in their network. Participants commented: *'If I wanted a certain study, for example, I ask a certain mentor who knows about this subject or market segment ... and they usually have studies that they can give'* (F10); *'...if I don't know or I'm interested to know, there is more than one way. If I know that he will come to a conference or seminar or any event, I will go for sure'* (F2). Pre-entrepreneurial experience that the female technology entrepreneurs possess is critical in shaping and explaining their entrepreneurial process (Cooper et al. 2011). Thus, clearly this research suggests that they were exposed to the process of how businesses manage and plan their relationships.

On the other hand, the cultural and socio-economic context in Jordan exhibits some characteristics which might have affected these findings. GEM-MENA's report indicated that

Jordanians entrepreneurs are less likely to secure finance from their family members (Stevenson et al., 2010). Using informal source to secure seed funds is sometime difficult in Jordan, especially with its low GDP per capita income, which in 2014 reached \$11,782, compared with \$17,170 in Lebanon. In addition, a woman as an entrepreneur still feels the effect of social stereotyping which sees her economic role as a traditional rather than professional one. This may suggest why female entrepreneurs in Jordan who are seeking resources and help prefer formal and direct connections through business ties. F6's comment reflected this: *'I typically don't like social introductions too much because I feel like, um, I don't like to be introduced to someone within a social structure, because they were kind of, um, although I know this is how businesses are formed, I feel like as a woman we're more, um, we have a little bit more, um, something we have more to prove, we need to appear even more professional than the average man to get the same amount of respect. So, I try very often ... if somebody just says, 'Oh, I know so and so, I can introduce you', I prefer that we are introduced, for example, in a meeting or if he sends him a direct email and then I can follow up. Yes, I don't like to be introduced in a social event, because I feel like it's, I don't know'*.

CONCLUSIONS

This comprehensive analysis of the networks developed by Jordanian female entrepreneurs to support the development of their technology-based firms, focusing on structure, content and network evolution, has revealed a network model which is different from that recognised in studies of Western women. Its findings take the literature in female entrepreneurship, female entrepreneurs' networking activities and network processes a further step. In addition, the work makes a contribution to resource dependency theory through explaining the role of the entrepreneur's ego network in managing resource identification and acquisition.

This new model regarding the network development process as it relates to structure, content and evolution helps set out a future research agenda to test and refine this model in studies related to female technology entrepreneurs' networks in other Middle East societies, as well as Jordanian female entrepreneurs from other sectors in order to help understand the industry effect.

Implications of this study for policy suggests that alongside increasing the efforts to develop technical and managerial aspects relating to entrepreneurship at the educational level, the role of all type of network ties (social and formal business ties) should be addressed and networking activities should be addressed to enable would-be and current entrepreneurs to better understand the value of the network and well as how best to design and develop a network for venture development and growth. As complementary efforts, governmental programmes should be directed toward creating and building channels which help foster connections with the different sources of resources, including business owners, investors, well-established firms, other entrepreneurs, encompassing the regional and international opportunities. Increased efforts in developing entrepreneurs' networking meetings and clubs by different parties, including entrepreneurial business organisations, government business support organisations, private firms and universities, are required. Women business-owners and those who are at managerial levels in different government and private sector organisations should be encouraged to participate in these networking meetings and clubs, as participation by these women could encourage more women to attend such events and help both actual and would-be entrepreneurs to recognised the advantages of business ownership and how to develop and utilise their networks to best effect.

High Technology Small Firms Conference

REFERENCES

- Al Jidara (2007) *Tracking the progress of Jordanian women in the ICT space*. Amman: The United Nations Development Fund for Women.
- Al Jidara (2014) *Jordan women in the ICT space*. Jordan: United Nations Women, Country Office for Jordan.
- Aldrich, H. (1989) 'Networking among women entrepreneurs', in Brush, C., Carter, N., Gatewood, E., Greene, P. and Hart, M. (eds.) *Women and entrepreneurship*. United Kingdom: The International Library of Entrepreneurship. pp. 209-235.
- Batjargal, B. (2010) 'Network dynamics and new ventures in China: A longitudinal study'. *Entrepreneurship and Regional Development*, 22(2), pp. 139-153. DOI: 10.1080/08985620802628864.
- Bearing Point (2007) *Jordan gender assessment*. Amman: United State Agency for International Development (USAID).
- Blaikie, N. (2009) *Designing social research*. Cambridge: Polity Press.
- Borgatti, S. and Foster, P. (2003) 'The Network Paradigm in Organizational Research: A Review and Typology', *Journal of Management*, 29(6), pp. 991-1013. DOI: 10.1016/S0149-2063(03)00087-4.
- Brass, D., Galaskiewicz, J., Greve, H. and Tsai, W. (2004) 'Taking stock of networks and organizations: A multilevel perspective', *The Academy of Management Journal*, 47(6), pp. 795-817. DOI: 10.2307/20159624.
- Burt, R. (1992) *Structural holes: the social structure of competition*. Cambridge: Harvard University Press.
- Capaldo, A. (2007), 'Network structure and innovation: the leveraging of dual network as a distinctive relational capability', *Strategic Management Journal*, 28(6), pp. 585–608. DOI: 10.1002/smj.621.
- Coleman, J. (1988) 'Social capital in the creation of human capital', *The American Journal of Sociology*, 94, pp. 95-120.
- Dubini, P. and Aldrich, H. (1991) 'Personal and extended networks are central to the entrepreneurial process', *Journal of Business Venturing*, 6(5), pp. 305–313. DOI: 10.1016/0883-9026(91)90021-5.
- Elfring, T. and Hulsink, W. (2007) 'Networking by Entrepreneurs: Patterns of Tie Formation in Emerging Organizations', *Organization Studies*, 28(12), pp. 1849-1872. DOI: 10.1177/0170840607078719.
- Freeman, L. (1979) 'Centrality in social networks conceptual clarification', *Social networks*, 1(3), pp. 215-239. DOI: 10.1016/0378-8733(78)90021-7.
- FYGL and BC (2011) 'Accelerating entrepreneurship in the Arab World', *World Economic Forum Special Meeting on Economic Growth and Job Creation in the Arab World*, Jordan October 21-23.
- Granovetter, M. (1973) 'The strength of weak ties', *American Journal of Sociology*, 78(6), pp. 1360–1380.
- Granovetter, M. (1985) 'Economic action and social structure: The problem of embeddedness. American', *Journal of Sociology*, 91(3), pp. 481–510.
- Grave, A. and Salaff, J. (2003) 'Social networks and entrepreneurship', *Entrepreneurship Theory and Practice*, 28(1), 1-22. DOI: 10.1111/1540-8520.00029.
- Hampton, A, Cooper, S. and McGowan, P., (2009), 'Female entrepreneurial networks and networking activity in technology-based ventures: an exploratory study', *International Small Business Journal*, 27(2), pp. 193-214.
- Hampton, A., McGowan, P. and Cooper, S. (2011) 'Developing quality in female high-technology entrepreneurs' networks', *International journal of entrepreneurial behaviour and research*, 17(6), pp. 588-606. DOI: 10.1108/13552551111174684.
- Hanlon, D. and Saunders, C. (2007) 'Marshaling resources to form small new ventures: Toward a more holistic understanding of entrepreneurial support', *Entrepreneurship Theory and Practice*, 31(4), pp. 619-641. DOI: 10.1111/j.1540-6520.2007.00191.x.
- Hansen, E. (1995) 'Entrepreneurial networks and new organization growth', *Entrepreneurship: Theory and Practice*, 19(4), pp. 7–21.
- Hite, J. (2005) 'Evolutionary processes and paths of relationally embedded network ties in emerging entrepreneurial firms', *Entrepreneurship Theory and Practice*, 29(1), pp. 113–144. DOI: 10.1111/j.1540-6520.2005.00072.x.

- Hite, J. and Hesterly, W. (2001) 'The evolution of firm networks: From emergence to early growth of the firm', *Strategic Management Journal*, 22(3), pp. 275–286. DOI: 10.1002/smj.156.
- Hoang, H. and Antoncic, B. (2003) 'Network-based research in entrepreneurship: A critical review', *Journal of Business Venturing*, 18(2), pp. 165–187. DOI: 10.1016/S0883-9026(02)00081-2.
- IFC and CAWTAR (2007) *Women entrepreneurs in the Middle East and North Africa: characteristics, contributions, and challenges*. Washington DC: International Finance Corporation and Tunis: Centre of Arab Women for Training and Research.
- Intaj (2013) *Jordan's ICT business guide*. Available at: <http://www.intaj.net/> (Accessed: 11 April 2014).
- Jack, S. (2005) 'The role, use and activation of strong and weak network ties: A qualitative analysis', *Journal of Management Studies*, 42(6), pp. 1231–1259. DOI: 10.1111/j.1467-6486.2005.00540.x.
- Jack, S. (2010) 'Approaches to studying networks: Implications and outcomes', *Journal of Business Venturing*, 25(1), pp. 120–137. DOI: 10.1016/j.jbusvent.2008.10.010.
- Jack, S., Drakopoulou-Dodd, S. and Anderson, A. (2004) 'Social structures and entrepreneurial networks: The strength of strong ties', *International Journal of Entrepreneurship and Innovation*, 5(2), pp. 107-120. DOI: 10.5367/000000004773863264.
- JDS (2015) *The unemployment rate during the fourth quarter of 2014*. Available at: http://www.dos.gov.jo/dos_home_e/main/archive/Unemp/2014/Emp_2014-q4.pdf (accessed: 14th February 2015).
- Johannisson, B. (1998) 'Personal networks in emerging knowledge based firms: spatial and functional patterns', *Entrepreneurship and Regional Development*, 10(4), pp. 297–312. DOI: 10.1080/08985629800000017.
- Kanter, R. (1984) *The change masters: innovation and entrepreneurship in the American corporation*. New York: Simon and Schuster.
- Klyver, K. and Terjesen, S. (2007) 'Entrepreneurial network composition: An analysis across venture development stage and gender', *Women in Management Review*, 22(8), pp. 682-688. DOI: 10.1108/09649420710836344.
- Kontinen, T. and Ojala, A. (2011) 'Network ties in the international opportunity recognition of family SMEs', *International Business Review*, 20(4), pp. 440-453. DOI: 10.1016/j.ibusrev.2010.08.002.
- Larson, A. and Starr, A. (1993) 'A network model of organization formation', *Entrepreneurship: Theory and Practice*, 17(2), pp. 5–15.
- Lechner, C. and Dowling, M. (2003) 'Firm networks: external relationships as sources for the growth and competitiveness of entrepreneurial firms', *Entrepreneurship and Regional Development*, 15(1), pp. 1-26. DOI: 10.1080/08985620210159220.
- Marion, T., Eddleston, K., Friar, J. and Deeds, D. (2015) 'The evolution of interorganizational relationships in emerging ventures: An ethnographic study within the new product development process', *Journal of Business Venturing*, 30(1), pp. 167–184. DOI: 10.1016/j.jbusvent.2014.07.003.
- Martinez, M. and Aldrich, H. (2011) 'Networking strategies for entrepreneurs: balancing cohesion and diversity', *International Journal of Entrepreneurial Behavior and Research*, 17(1), pp. 7-38. DOI: 10.1108/13552551111107499
- McEvily, B. and Zaheer, A. (1999) 'Bridging ties: A source of firm heterogeneity in competitive capabilities', *Strategic Management Journal*, 20(12), pp. 1133-1156.
- McGowan, P., Cooper, S. and Hampton, A. (2013) 'Developing quality in networks: an analysis of male and female entrepreneurs in science, engineering and technology based venture', in Oaky, R., Groen, A., Cook, G. and Sijde, P. (eds.) *New technology-based firms in the new millennium*. United Kingdom: Emerald Group Publishing Limited. pp. 71-94.
- MHESR (2013) *The annual report of the higher education in Jordan 2012/2013*. Available at: <http://www.mohe.gov.jo/Statistics/tabid/69/language/ar-JO/Default.aspx> (accessed: 12th February 2015).
- Miles, M. and Huberman, A. (1994) *Qualitative data analysis*. Beverly Hills: Sage Publication.
- Moensted, M. (2010) 'Networking and entrepreneurship in small high-tech European firms: An empirical study', *International Journal of Management*, 27(1), pp. 16-30.
- Moran, P. (2005) 'Structural vs. relational embeddedness: social capital and managerial performance', *Strategic Management Journal*, 26(12), pp.1129-1151. DOI: 10.1002/smj.486.

- MPIC and UND (2011) *Jordan human development report 2011: Jordan Small Businesses and Human Development*. Jordan: the Ministry of Planning and International Cooperation and United Nations Development Programme.
- Ozdemir, S., Moran, P., Zhong, X. and Bliemel, M. (2014) 'Reaching and acquiring valuable resources: the entrepreneur's use of brokerage, cohesion, and embeddedness', *Entrepreneurship Theory and Practice*, pp.1-31. DOI: 10.1111/etap.12103.
- Patton, M. and Patton, M. (2002) *Qualitative research and evaluation methods*, 3rd edn. California: Thousand Oaks and London: Sage Publication.
- Peebles, D., Darwazeh, N., Ghosheh, H. and Sabbagh, A. (2007) *Factors affecting women's participation in the private sector in Jordan*. Jordan: National Centre for Human Resource Development and Al Manar Human Resource Development Information System Project.
- Pfeffer, J. and Salancik, G. (1978) *The external control of organizations: A resource dependence perspective*. New York: Harper and Row.
- Powell, W. (1990) 'Neither market nor hierarchy: net-work forms of organization', in Staw B. and Cummings L. (eds.) *Research in Organizational Behavior*, 12. JAI Press. pp. 295-336.
- Rivera, M., Soderstrom, S. and Uzzi, B. (2010) 'Dynamics of dyads in social networks: assortative, relational and proximity mechanisms', *Annul. Review Sociol*, 36, pp. 91–115. DOI: 10.1146/annurev.soc.34.040507.134743
- Robb, A. and Coleman, S. (2010) 'Financing strategies of new technology-based firms: A comparison of women-and men-owned firms', *Journal of Technology Management and Innovation*, 5(1), pp. 30-50. DOI: 10.4067/S0718-27242010000100003.
- Rowley, T., Behrens, D. and Krackhardt, D. (2000) 'Redundant Governance Structures: An analysis of structural and relational embeddedness in the steel and semiconductor industries', *Strategic Management Journal*, 21(3), pp. 369-386.
- Semrau, T., and Werner, A. (2014) 'How exactly do network relationships pay off? The effects of network size and relationship quality on access to start-up resources', *Entrepreneurship Theory and Practice*, 38(3), pp. 501-525. DOI: 10.1111/etap.12011.
- Siu, W. and Bao, Q. (2008) 'Network strategies of small Chinese high-technology firms: A qualitative study', *Product Innovation Management*, 25(1), pp. 79-102. DOI: 10.1111/j.1540-5885.2007.00284.x.
- Slotte-Kock, S. and Coviello, L. (2010) 'Entrepreneurship research on network processes: A review and ways forward', *Entrepreneurship: Theory and Practice*, 34(1), pp. 31-57. DOI: 10.1111/j.1540-6520.2009.00311.x.
- Söderqvist, A. and Chetty, S. (2013) 'Strength of ties involved in international new ventures', *European Business Review*, 25(6), pp. 536-552. DOI: 10.1108/EBR-03-2013-0034.
- Steier, L. and Greenwood, R. (1999) 'Newly created firms and informal angel investors: A four stage model of network development', *Venture Capital*, 1(2), 147-167. DOI: 10.1080/136910699295947.
- Steier, L. and Greenwood, R. (2000) 'Entrepreneurship and the evolution of angel financial networks', *Organization Studies*, 21(1), pp. 163–92. DOI: 10.1177/0170840600211002.
- Stevenson, L., Daoud, Y., Sadeq, T. and Tartir, A. (2010) *Global entrepreneurship monitor: GEM-MENA regional report 2009: Middle East and North Africa*. Giza: International Development Research Centre.
- Sullivan, D., and Ford, C. (2014) 'How entrepreneurs use networks to address changing resource requirements during early venture development', *Entrepreneurship: Theory and Practice*, 38(3), pp. 551-574. DOI: 10.1111/etap.12009.
- Wennekers, S. and Thurik, R. (1999) 'Linking entrepreneurship and economic growth', *Small business economics*, 13(1), pp. 27-56. DOI: 10.1023/A:1008063200484.
- Whittemore, R. and Knafl, K. (2005) 'The integrative review: updated methodology', *Journal of advanced nursing*, 52(5), pp. 546-553. DOI: 10.1111/j.1365-2648.2005.03621.x.
- Witt, P. (2004) 'Entrepreneurs' networks and the success of start-ups', *Entrepreneurship and Regional Development: An International Journal*, 16(5), pp. 391-412. DOI: 10.1080/0898562042000188423.
- World Bank (2013) *Doing business 2013: Smart Regulations for Small and Medium-Size Enterprise*. Washington: International Bank Reconstruction Development/ The World Bank.

High Technology Small Firms Conference