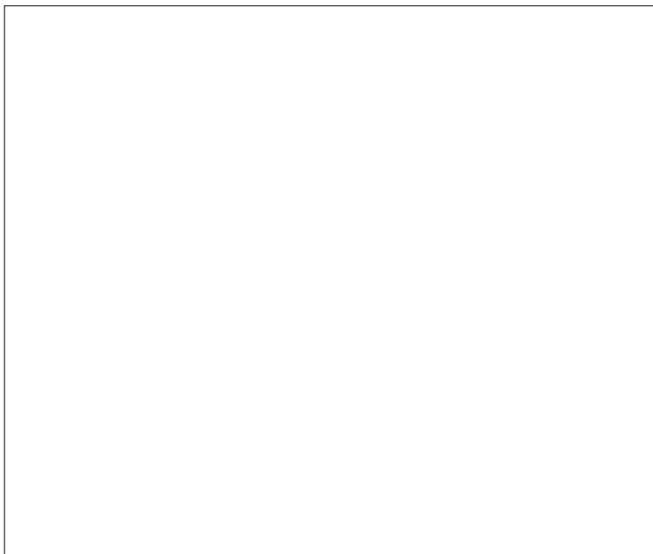


Table 5. Countries with more presence and more influential organizations in Subgroups

Subgroup	Countries with more presence	Organizations with greater centrality index
0 (Green)	Peru, USA y Germany	2 INVR us 126 STUP pe 129 STUP pe 82 SERV pe 161 STUP pe
1 (Red)	Chile, Argentina and USA	3 INVR ar 132 INVR cl 72 UNIV cl 61 INVR cl 68 STUP us
2 (Blue)	Peru and USA	7 INVR pe 86 INCU pe 134 MENT pe 18 STUP pe 69 STUP us
3 (Yellow)	Peru and Brazil	49 SERV pe 102 INCU pe 124 STUP pe 142 PUBL pe 110 PUBL pe

Source: Prepared by the authors

Figure 10. Subgroups in the Interorganizational network with global nodes



Source: Prepared by the authors

Conclusions

According to the work carried out in the analysis of interorganizational networks, it is concluded that there is an ecosystem of technological entrepreneurship in Lima with the link between the different elements: the community of entrepreneurs, mentors, incubators, accelerators, service providers Common investors, angel investors, venture capital investors, universities, public support entities and linking with other ecosystems. In this ecosystem, start-ups and mentors (the community of entrepreneurs) constitute the largest percentage of entities in the network and generally have a presence and leadership in the ecosystem.

The indexes show a high centrality of the investors, being the most connected actors, who have more influence, who are intermediaries among other actors and who have more proximity to other nodes. Thus, investors are also actors who have a significant presence in the ecosystem. On the other hand, universities and public institutions have a high link between them, but in general they show a low integration with the start-ups of Lima ecosystem, except the incubators of the universities that they interact with the start-ups through Government programs for ecosystem development.

In particular, in LinkedIn sectorial classification, the information technology, Internet, management and marketing, and advertising services sectors of the ecosystem are more active. This means that start-up activity is not developing at the same level in other emerging technologies such as new materials and biotechnology, among others, which requires a special public policy effort.

With respect to international connections, it is observed that the ecosystems of the USA, Chile, Argentina, Colombia, Mexico and Brazil are the ones that have the greatest linkage and therefore are the most influential in the technological entrepreneurship ecosystem of Lima. In addition, there is a smaller link with ecosystems in Canada, Germany, Spain, Indonesia, Australia, China, Costa Rica, Ecuador, Estonia, United Kingdom, Italy, Netherlands, Portugal, Romania, Singapore, Ukraine, Uruguay and Vietnam.

In the exploratory study (Hernández & González, 2016) and prior to this investigation was concluded that from the perspective of the entrepreneurs, there are all elements of the entrepreneurial ecosystem in the city of Lima, although the perception of these is completing, as the enterprise is advancing in its stages of development. In this study of analysis of interorganizational networks, it is corroborated that the entrepreneurial ecosystem of Lima presents these elements and it is

added that there is an intense interaction between them, which has developed in the city in recent years. However, as noted in the previous conclusions, there is still a need for greater interaction between some elements, mainly universities and public entities.

Finally, as future research, it is proposed that the knowledge of Lima's technological entrepreneurship ecosystem could be further expanded through surveys of a representative sample of the members of the entrepreneurs community, in order to understand in greater depth which facilitators and barriers that are presented for the development of this ecosystem. Also, other tools from different branches of science could be applied to analyze the ecosystem, its determinants and its impact, as is the case of this study where the social networks analysis, a tool from sociology has been applied.

References

- Ayala, D., & González, M. (2010). *Ángeles inversores una nueva modalidad de financiamiento para los emprendimientos en Latinoamérica*. Cuenca: Universidad de Cuenca.
- CCL. (2016). *Cámara de Comercio de Lima*. Retrieved from <http://www.camaralima.org.pe/principal/categoria/historia/3/c-3>
- Christakis, N., & Fowler, J. (2009). *Connected: The Surprising Power of Our Social Networks and How They Shape Our Lives*. New York: Little, Brown and Co.
- Churchill, N., & Lewis, V. (1983). *The Five Stages of Small Business Growth*. Harvard Business Review.
- Edwards, G. (2010). *Mixed-Method Approaches to Social Network Analysis*. Manchester: National Centre for Research Methods, University of Manchester.
- Eshu Ossai-Igwe, L., & Mohd Sobri, M. (2011). *The Conceptual Framework of Entrepreneur and Self Management*. Utara: Universiti Utara Malaysia.
- Feld, B. (2012). *Startup Communities: Building an Entrepreneurial Ecosystem in Your City*. New Jersey: John Wiley & Sons, Inc.
- Fetters, M., Greene, P., Rice, M., & Butler, J. (2010). *The Development of University-Based Entrepreneurship Ecosystems*. Cheltenham/Northampton: Edward Elgar Publishing Limited.
- González, M., & Campelo, M. (2004). *Planificación interorganizacional y desarrollo emprendedor: un estudio de caso (CIPEAL 2004 ed.)*. Rio de Janeiro.
- Gonzalez, M., Vela, J., & Ochoa, R. (2001). *Metodología para la evaluación del potencial emprendedor universitario*. San José: ALTEC 2001.
- González, M., Vela, J., & Ochoa, R. (2003). *Evaluación del potencial emprendedor universitario para la generación de empresas de base tecnológica: un estudio de caso*. México: ALTEC 2003.
- Hausmann, R., Hidalgo, C. A., Bustos, S., Coscia, M., Chung, S., Jimeñez, J., et al. (2011). *The atlas of economic complexity mapping paths to prosperity*. Cambridge: MIT Press.
- Hernández, C., & González, D. (2016). *Study of the Start-Up Ecosystem in Lima, Peru: Collective Case Study*. Latin American Business Review, 115-137.
- Hernández, R., Fernández, C., & Baptista, M. (2010). *Metodología de la investigación*. México: McGraw-Hill.
- Hisrich, R., Peters, M., & Shepherd, D. (2012). *Entrepreneurship*. New York: McGraw-Hill Irwin.
- Kadushin, C. (2013). *Comprender las redes sociales: teorías, conceptos y hallazgos*. Madrid: CIS.
- Kerrick, S. A., Cumberland, D., Church-Nally, M., & Kemelgor, B. (2014). *Military veterans marching towards entrepreneurship: An exploratory mixed methods study*. The International Journal of Management Education, en prensa.
- LinkedIn Corporation. (2016a). *Authenticating with OAuth 2.0*. Retrieved from <https://developer.linkedin.com/docs/oauth2>
- LinkedIn Corporation. (2016b). *LinkedIn*. Retrieved from <https://www.linkedin.com/company-beta/1337?pathWildcard=1337>
- LinkedIn Corporation. (2016c). *Partner Program APIs*. Retrieved from <https://developer.linkedin.com/docs>
- OECD. (2009). *Clusters, Innovation and Entrepreneurship*. Paris: OECD.
- PRODUCE. (2016). *Start up Perú*. Retrieved from http://www.start-up.pe/emprendedores_innovadores.html
- Rochat, Y. (2009). *Closeness Centrality Extended To Unconnected Graphs: The Harmonic Centrality Index*. ASNA 2009.
- Salido, E., Sabás, M., & Freixas, P. (2013). *The Accelerator and Incubator Ecosystem in Europe*. European Commission, Telefónica.
- Schumpeter, J. A. (1911). *The theory of the economic development. an inquiry into profits, capital, credit, interest and the business cycle*. Translation 1934. Cambridge: Harvard University Press.
- Serida, J., Morales, O., & Nakamatsu, K. (2012). *Global Entrepreneurship Monitor: Perú 2011*. Lima: Universidad ESAN.
- Shane, S., & Venkataraman, S. (2000). *The promise of entrepreneurship as a field of research*. Academy of Management Review, Vol. 25, No. 1, 217-226.
- Startup Commons. (2015). *Startup Key Stages*. Retrieved March 2016, 10, from <http://www.startupcommons.org/startup-key-stages.html>

UNAM. (2013). Startups, modelo para una economía emergente y creativa. Retrieved from <http://www.revista.unam.mx/vol.15/num1/art07/>

UNS. (2016). Análisis de redes sociales. Retrieved from Universidad Nacional del Sur de Argentina: <http://ars-uns.blogspot.com>

Wasserman, S., & Faust, K. (2013). Análisis de redes sociales: Métodos y aplicaciones. Madrid: Centro de Investigaciones Sociológicas.
World Economic Forum. (2009). Educating the Next Wave of Entrepreneurs. Cologny/Geneva.

Zahra, S. A., & Nambisan, S. (2012). Entrepreneurship and strategic thinking in business ecosystems. *Business Horizons*, 219–229.