Developing a Competency Framework for Intergenerational Startup Innovation in a Digital Collaboration Setting

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Keywords: Competency Framework, Intergenerational Innovation, Global Start-up, Digital Collaboration, Computer-Supported Collaboration, Cross-generational Collaboration.

Abstract: This study proposes a framework for the collaborative development of global start-up innovators in a multigenerational digital environment. Intergenerational collaboration has been identified as a strategy to support entrepreneurs during their formative years. However, integrating and fostering intergenerational collaboration remains elusive. Therefore, this study aims to identify competencies for successful global start-ups through intergenerational knowledge transfer. We used a systematic literature review to identify a competency set consisting of growth virtues, effectual creativity, technical domain, responsive teamwork, values-based organization, sustainable networking, cultural awareness, and facilitating intergenerational safety. The competency framework serves as a foundation for knowledge management research on the global innovation readiness of people to collaborate across generations in the digital age.

1 INTRODUCTION

This research aims to highlight the competencies for intergenerational collaboration in the digital age of start-ups. Entrepreneurs today can expand globally due to technological advancements. However, many significant barriers to developing global start-ups have been identified, including geographic isolation, lack of trust, and aversion to imitation (Jensen, 2017; Zakaria et al., 2004). One significant stumbling block is a lack of competencies and successful characteristics (Clercq et al., 2012; Giardino et al., 2014; Nurhas et al., 2020), particularly in the early stage when strategic organizational decisions are often urgently needed (Clercq et al., 2012; Giardino et al., 2014). One promising approach is an intergenerational collaborative innovation (Matlay & Gimmon, 2014; Underdahl et al., 2018), defined for this study as collaboration in a virtual environment for innovation activities between senior and younger adults with an age difference of 20 years and more (Brečko, 2021; Nurhas et al., 2020).

However, it remains unclear how to 1) integrate generational competencies and 2) promote intergenerational collaboration for global start-up innovation. Although society's generations change every twenty years, managing age and intergenerational disparities for innovation remains a concern for companies of all sizes (Brečko, 2021). Moreover, entrepreneurship research has identified entrepreneurial competencies (Arafeh, 2016; Bacigalupo et al., 2016; Dijkman et al., 2016; Kyndt & Baert, 2015). However, little to no research incorporates and integrates intergenerational start-up entrepreneurship competency research into a cohesive block of our knowledge.

Therefore, based on a systematic literature review (Webster & Watson, 2002), we conceptualized and discussed a required competencies for the study context with two startup cofounders. This review combines mature studies of required competencies from multiple domains, such as entrepreneurship, global innovation, intergenerational and digital collaboration. The study proposed an eight-competency-group framework, with each group encompassing a different activity level related to global innovation, intergenerational collaboration, and digital activities.

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2 BACKGROUND

Although the terms competency and competence are often used interchangeably to describe a skill or required knowledge for a particular state or function (Holtkamp et al., 2015) , we used the term competency. The term competency typically refers to the knowledge, skills, and abilities required to solve specific problems in specific contexts. In this study, we consider integrating attitudes (Bosma & Schutjens, 2011), which include individual preferences, virtues, and character traits (Bosma & Schutjens, 2011; Karlson & Fergin Wennberg, 2014). At the organizational level, organizational capabilities combine individual and group competencies as human resources that complement each other to form a specific set of expertise (Saa-Perez & Garcia-Falcon, 2002). Therefore, it is critical to examine the individual competencies required for start-ups to develop as an organization.

The decision to engage in intergenerational collaboration is not an easy path for organizations; several barriers have been identified, including individual, perceptual, and technical/operational (Giardino et al., 2014; Nurhas et al., 2020). Technology is being widely used to support intergenerational collaboration and demographically segregated teams, becoming increasingly important in the era of digitalization (Lyashenko & Frolova, 2014; Nurhas et al., 2020; Shi et al., 2019; Underdahl et al., 2018).

Being an entrepreneur in a multigenerational environment, on the other hand, requires a unique set of skills, especially if the goal is to (transition to) an international business model. As a result, current research on identified competencies needs to be expanded and complemented by global innovation. Previous research has identified different types of competencies for entrepreneurs, such as self-confidence and autonomy (Arafeh, 2016; Lans et al., 2010; Mitchelmore & Rowley, 2010), taking calculated risks and recognizing opportunities (Arafeh, 2016; Kyndt & Baert, 2015), creativity, and problem-solving (Jensen, 2017; Mitchelmore & Rowley, 2010; Rasmussen et al., 2011; Wu, 2009), The entrepreneurs also required to take action by transforming information into actionable strategy (Arafeh, 2016; Bacigalupo et al., 2016; Kyndt & Baert, 2015). Concerning global innovation, critical elements such as creativity, cultural empathy, teamwork, networking, and organizational space and vision can serve as a basis for categorization (Griffith et al., 2016; Jensen, 2017; Lombardi, 2010). This may pave the way for the identification of complementary competencies for this study context as needed for intergenerational collaboration in various settings, including family businesses (Miller et al., 2003; Shi et al., 2019), professional and knowledge-intensive workplace organizations, and higher education. There is still a need to understand what competencies are required for successful intergenerational collaboration, especially when using digital technologies.

3 METHOD

Systematic Literature Review (SLR) was used in this study. SLR helps develop conceptual models based on fragmented research (Webster & Watson, 2002) The following research question was proposed in response to the issues presented in the introduction: *Which competencies are required for global start-up entrepreneurs working in intergenerational settings?*

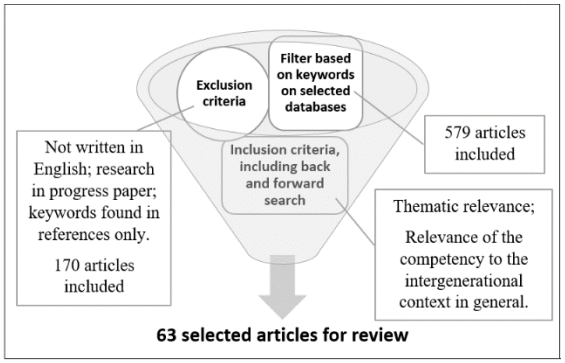

Figure 1: Systematic literature review process.

For the SLR method, the guideline of conducting SLR (Webster & Watson, 2002) was applied. The research phase begins with the planning process, based on the identified research question. The selection of keywords was defined. On October 27, 2017, the following keywords were searched for: [[competence OR competency OR capability OR skill OR attitude OR behavior] AND ["global innovation" OR "Intergenerational Innovation" OR "intercultural Innovation" OR "cross-generational Innovation"] AND [entrepreneurs OR start-ups]]. Scholarly databases of related disciplines such as Springerlink, AIS e-Library, ACM Digital Library, Sciencedirect, and information systems senior scholar “basket of eight” journals were used to find relevant articles. For the inclusion criteria: an article should be written in English, highlighting the importance of studying competencies and articles that focus on providing relevant competencies for intergenerational learning context, entrepreneurship, digital collaboration, and start-ups development. For the exclusion criteria: "Research in Progress," or short articles, an opinion article should be removed from the list, also an article

that does not focus on competencies or impacts of competencies.

Based on the selection process, the final 63 papers were selected for review. Manual and iterative coding for content analysis and conceptualization was used to develop a more abstract level of capabilities to cover a wide range of individual-level competencies. Each competency mentioned or discussed in the selected literature was noted. The identified competencies were assigned to an initial classification of global innovation: creativity, cultural empathy, teamwork, networking, and organizational space and vision (Jensen, 2017; Knight & Cavusgil, 2004) or, if not relevant, were grouped into new categories. The label concept for the group of competencies was refined based on the collection of competencies. The development of the conceptual framework was fundamentally abductive. It resulted in an attempt to determine the best way to describe the competencies and competency groups found in the selected literature.

4 RESULT

Table 1 depicts the conceptual matrix (Webster & Watson, 2002) of intergenerational start-up competency in the digital age following the explanation of each competency category for the study context, which includes growth virtues (Gv), effectual creativity (Ec), technical domain (Td), responsive teamwork (Rt), values-driven Organizing (Vo), sustainable networking (Sn), cultural awareness (Ca), and intergenerational safety facilitation (Is). While there is only one category labeled "intergenerational," other categories are also used in this setting.

Growth virtues are a characteristic valued by the individual or social group; in this context, we derived the growth virtues competency from personal competencies. We define growth virtues as values that belong to intergenerational start-ups' innovators to evolve and grow to meet various global innovation challenges. Five virtues fall into this competency group: grit, self-determination, conscientiousness, intergenerational reflection, and resilience. These five competency virtues are included in the virtues of growth because they referred to individual values acquired through learning and shared experience and practiced in developing digital start-ups. Growth virtue must be present to develop and innovate further amid global innovation and intergenerational collaboration challenges.

Effectual creativity is associated with institutional creativity for global innovation. Foresight thinking and global design thinking are two competencies included in this category. By focusing on global innovation, both competencies are related to creating a global business model focused on available capital, local values, and stakeholders. Effectual creativity creates products or services by managing future performance based on the availability of resources.

Technical domain expertise. In this category, several competencies are remarkably similar, namely the operationalization of specific skills and the use of tools. Competency in this category includes financial negotiations, digital information fluency, legal analysis, financial negotiations, and digital competency associated with operating digital devices to optimize digital information for innovation collaboration purposes.

Responsive teamwork is a group of competencies highlighting the importance of constructive peer feedback for teamwork progression. The competencies included in this category are active listening, conflict resolution, intergenerational orientation, auxiliary skill. These competencies share common features supporting interpersonal relationships in working with teams within a generation or different generations. Furthermore, auxiliary skill is vital to help their peers overcome their challenges and difficulties, supporting their organization in long-term collaboration.

Value-driven organizing. For the fourth category, the focus of the capability covered by this dimension is on competencies for managing and empowering the resources based on the shared belief. The competencies in this category include visioning, personal resource allocation, quality orientation, decisiveness. Visioning shows the important role of value in providing direction for defining organization strategy. In addition to global innovation, the ability to manage and optimize human resources, focusing on the quality and decisiveness by simplification steps to make the organizational strategy more natural to implement and minimize all forms of risk.

Sustainable networking brings together all the skills closely linked to professional bonds outside the organization. Three competencies for this group are influencing, transparency, effective communication. In the context of global innovation, global start-up innovators require the optimization of long-term professional networks. This provides the ability to influence professional networks' functions and ensure transparency and communication effectiveness of different channels and foreign languages.

Cultural awareness is about competencies that underline the importance of valuing cultural differences. Under this category, a global start-up innovator travels to another country with a different culture, searching for partners, developing products and services based on the global and local value in line with its objectives. Two skills we need to

Table 1: Concept matrix.

literature	Concepts							
	Gv	Ec	Td	Rt	Vo	Sn	Ca	In
Abbott et al., 2013		x		x	x	x	x	x
Arafeh, 2016	x	x			x	x		
Audzeyeva & Hudson, 2016					x	x		
Bacigalupo et al., 2016	x	x	x	x	x			
Bala et al., 2017	x			x	x	x		
Barrett, 2014							x	x
Bharadwaj et al., 2010	x		x					
Blackburn et al., 2003	x		x	x	x	x	x	
Boughzala et al., 2012		x				x		x
Cheng & Huizingh, 2014	x	x						
Czarnitzki & Lopes-Bento, 2014			x					
Davis et al., 2009	x			x	x			
Dijkman et al., 2016	x	x	x	x	x			
Dimitratos et al., 2014	x			x	x	x		
Dohmen et al., 2014	x					x		
Dong & Wu, 2015		x			x			
Duckworth et al., 2007	x							
Duhan et al., 2001	x	x	x		x	x		x
European Communities, 2006	x		x			x	x	
Fantini & Tirmizi, 2006	x					x	x	x
Foster-Fishman et al., 2001		x		x			x	
Getha-Taylor, 2008				x			x	x
Goldsmith & Eggers, 2005		x		x	x	x		x
Griffith et al., 2016					x			x
Hamel, 2008	x	x						
Hammer et al., 2003				x				x
Hertel et al., 2006	x	x				x	x	x
Igbaria & Baroudi, 1993		x			x			
Kohli & Grover, 2008			x				x	
Kollmann et al., 2009		x			x			
Kungwansupaphan & Siengthai, 2014	x							x
Kyndt & Baert, 2015	x	x			x	x		
Lans et al., 2010		x		x	x			x
Li et al., 2016	x	x	x	x	x	x		
Lim et al., 2013	x	x	x					
Liu, 2016						x		
Lombardi, 2010							x	x
Markham & Lee, 2013	x	x	x			x		
Martins & Terblanche, 2003	x	x		x	x			x
Martinsons & Ma, 2009			x		x	x		
Miranda & Kavan, 2005				x				
Moro et al., 2014		x			x			
Newman et al., 2017			x					x
Nielsen, 2015		x		x	x	x		x
Ojala, 2016	x	x						
Quadros Carvalho et al., 2013	x	x	x		x			
Rasmussen et al., 2011	x	x						
Rasmussen et al., 2014	x	x						
Reid & Brentani, 2015					x			x
Reid et al., 2014		x			x			x
Ritter & Gemünden, 2003			x			x		
Sahay, 2004			x		x	x	x	
Sánchez, 2013	x				x			
Sarker & Sahay, 2003	x				x	x	x	x
Várhegyi & Nann, 2011						x	x	x
Vuorikari et al., 2016			x		x			
Watts et al., 2013	x			x	x	x	x	x
Wei et al., 2011			x					x
Wu, 2009	x		x	x	x	x		x
Xu et al., 2007			x					x
Zakaria et al., 2004						x	x	
Zimmermann & Ravishankar, 2014						x	x	x
Zimmermann et al., 2013	x			x	x	x	x	

consider in this category are pluralistic thinking and digital empathy. Digital empathy is closely linked to cultural empathy, which is required to understand cultural cues in virtual environments.

Intergenerational safety facilitation deals with nurturing psychological safety in intergenerational collaboration. Competencies include are: intergenerational flexibility, intergenerational digital adaptability, and intergenerational leadership. Intergenerational flexibility can help provide a feeling of safety to express opinions and accept differences of opinion regarding new ideas or approaches. In digital collaboration, each generation can have a different background for the use of technology. Therefore, facilitating safety for both generations requires intergenerational digital adaptability to facilitate workforce diversity, and no generation feels excluded.

5 CASE STUDY

As an initial evaluation, the proposed comprehensive list of competencies and competency groups of inter-Generation startups-innOvators for globAL innovation (iGOAL) can be used in the context of human resource development to identify competency gaps and initiate appropriate interventions (in the form of training, matching, or recruitment processes). For instance, a readiness indicator based on this study result can be developed, which can be used for self-assessment of the startup actor (s). Two case studies were presented. We asked two different startup founders in two different countries about required competencies for startup development and discussed the proposed list of competencies and the competency group.

Case Study 1: an Indonesian IT company founded in 2015 develops an integrated app for waste management. The company connects community and financial institutions for turning waste into digital money, helping the government in decision making to design a smart city and collaborate with consumer-goods industries for trash management. In the context of intergenerational collaboration, the founder (29 years old) stated, *"…very important, but right now it is not a problem for us, because most of our team is at the same generation age..."* and currently at the stage for expanding their business model in other countries "…*The internationalization process of the business model right now is on the planned stage, since now we are preparing our collaboration with abroad partners...*"

As for the assessment tool, the founder notes that the tool could be helpful for their organization. The founder suggests a mutual assessment with the internal and external organization to reduce distortions in the assessment ("…*This readiness assessment tool will be maybe helpful for our organization, but it needs an independent assessment scoring because if we asses by our self, there could be a bias with the score…*"). Furthermore, the founder also recommends an online version of the tool for multiple uses, which allows the historical assessment result of the organization to be tracked ("*I think this tool should be running on mobile/web-based platform and can be used for several times, so that it can track the development of the existing score into the target score.*").

Case Study 2: a start-up was founded in 2019 by three cross-generational co-founders (<30 years old, mid 40, and >70 years old). The startup's focus is to provide personal consultancy and recruit new employees for specific vacancies, mainly in engineering industries. For this study, the younger co-founder described the current status of their organization in terms of global innovation and intergenerational collaboration. Despite the start-ups currently focus on the local market ("…*the company is strongly oriented towards the North-Rhine-Westphalia region (Germany). Due to the demand for personal service, an expansion on a national or even international level could only be implemented by a significant increase in the number of employees.."*), the intergenerational collaboration plays an integral part of their startup ("*Due to the joint founding with three members from different generations, it is an integral part of the business concept. The older generations bring experience and important business contacts to the business, while the younger generation is responsible for the implementation in a digital working environment.*.").

The founder took the prototype of the assessment tool and gave some feedback, first referring to the usefulness of the self-assessment as a starting point to reflect the condition of current start-ups (*"In particular, the competencies and rubrics taken into account enable a neutral assessment of one's own status. Here, it is interesting to reflect on the relevant contexts in order to be able to question one's own approach critically…, the tool can certainly reveal helpful starting points..."*).

Furthermore, for improvement, the founder proposed to add some examples for the competency and to compare the result with peers to get a better overview of the organization ("more detailed explanations or examples could contribute to understanding…"). And ("*…The evaluation is already very well presented at this point in time, but as a participant, I can only estimate the result to a limited extent without comparison. Here, individual recommendations for action derived from the results would be a huge added value for the participants…*").

The initial assessment of the proposed list of competencies and competency groups through two case studies demonstrates the potential of the study result for startup founders, but also for further investigation of the Startup Global Innovation Readiness Assessment in the context of intergenerational collaboration. The next section discusses the research findings and proposes a comprehensive overview of the study findings, limitations, and future research directions.

6 DISCUSSION

This paper offers a comprehensive set of intergenerational start-up innovation competencies for the digital age. Previous research has found that vision (Knight & Cavusgil, 2004) and personal characteristics (soft skills) are important (Bauman & Lucy, 2019; Karlson & Fergin Wennberg, 2014). More importantly, we offer a comprehensive view of innovation in an era of global digital collaboration and workforce diversity. We supplement previous research on global innovation success (Bauman & Lucy, 2019; Jensen, 2017; Knight & Cavusgil, 2004) and intergenerational competencies in start-up development (Bauman & Lucy, 2019). (for example, intergenerational flexibility, intergenerational leadership, intergenerational reflection, and orientation).

The concept of a competency group can be defined as a group of people who complement each other's skills. Group competency is more than just intrapersonal or group human capital. Start-ups can develop group competencies by matching individual

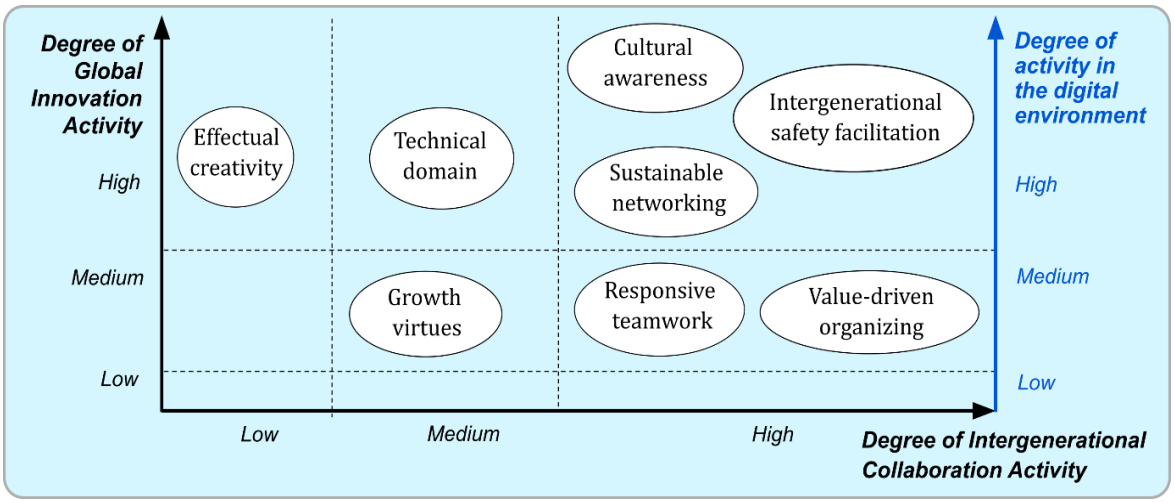

Figure 2: Intergenerational competency framework of global startup innovators in the digital age.

skills in a global and intergenerational setting. This research enlarges eight human-based start-up capital competencies (Jensen, 2017; Knight & Cavusgil, 2004). Between generational differences, effectual creativity that can support unique product development or global idea generation (Knight & Cavusgil, 2004), value-driven organizing and cultural awareness of other generations, quality focus, and cultural empathy are important (Jensen, 2017). The proposed list of group competencies highlights growth virtues, sustainable networking, responsive teamwork, and a group competency of intergenerational mobility safety facilitation that focuses on intergenerational mobility safety facilitation.

Developing a group competency based on individual competencies may enable founders to concentrate on their strengths. The framework can assist start-up stakeholders in matching and partnering (Bauman & Lucy, 2019). Furthermore, educational institutions can prioritize courses or curriculum development for start-up actors based on individual competencies. As a result, start-up actors can cultivate critical individual competencies and form appropriate partnerships. The findings could also be applied to developing supportive learning systems for global start-ups (Pawlowski et al., 2018).

In conclusion, we provide an overview of the conceptual competency framework for the study context shown in Figure 2, which can enable an intergenerational ecosystem. The framework can be used to understand and support innovation activities based on the identified concepts from the literature and the competency group related to the three activities: global innovation, intergenerational collaboration, and the use of digital technology. This study also provides an initial qualitative assessment of the proposed approach through open-ended questions in two case studies. The proposed framework could be a basis for future empirical studies on the competency of startup founders and promote intergenerational collaboration for startup internationalization.

Certain limitations should be noted. First, the literature review may not include all relevant disciplines and literature. Therefore, this study developed a higher/abstract competency group that encompasses a more general level of competency. A new relevant study that comes after the review process, if it contains a specific competency, can be assigned to one of the predefined categories. In addition, the proposed conceptual framework can be used as groundwork for future research. It can be validated empirically with experts and start-ups entrepreneurs.

ACKNOWLEDGEMENTS

The first author received a financial grant from the Ministry of Culture and Science of the State of North Rhine-Westphalia to work at the Institute of Positive Computing Hochschule Ruhr West.

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