A Systematic Literature Review on Intergenerational Tacit Knowledge Transfer: A KPI Perspective

Bettina Falckenthal[1], Cláudia Figueiredo[2] and Manuel Au-Yong-Oliveira[3]
[1]University of Aveiro, Portugal
[2]CIPES, DCSPT, University of Aveiro, Portugal
[3]INESC TEC, GOVCOPP, DEGEIT, University of Aveiro, Portugal

b.falckenthal@ua.pt
claudiafigueiredo@ua.pt
mao@ua.pt

Abstract: Organizations often have several generations working with them at the same time. Without an effective strategy experienced workers of older generations will leave the organizations taking with them a precious amount of relevant knowledge and skills. What do organizations currently do to support tacit knowledge transfer from Seniors to Juniors? Which formats have been proven to be especially successful? What Key Performance Indicators (KPI) could be used to evaluate cost and benefit of Tacit Knowledge Transfer across generations? Decision-makers faced with a potentially critical amount of tacit knowledge loss due to retiring senior experts are applying different solutions and strategies to overcome this problem, while encountering the challenge to measure and quantify the outcomes. Our research revealed that a gap exists regarding the balancing of the investment and compelling business cases for transferring tacit knowledge from senior to junior employees. We offer Key Performance Indicators (KPIs) with financial and social perspectives that may be applied to guide the enterprise. To achieve this, we conducted a thorough analysis and literature review to evaluate the business cases behind different formats of intergenerational knowledge transfer. Various studies have looked at the methodology behind intergenerational knowledge transfer: we analyzed publications that approach this matter from an organizational perspective including the start-up and Business Angel environment and a further stream of publications that look at the perspective of the individuals involved. Even though organizations are increasingly creative and willing to keep senior experts on board beyond legal retirement age the cost/benefit question is difficult to answer. The analyzed literature regarding Serious Games as one format for intergenerational tacit knowledge transfer was often based on small sample groups or specific needs of an organization or industry. The authors writing about Serious Games agreed that transferability was limited. Their contributions are nonetheless significant as the data collected in pilot projects is invaluable in any decision-taking process for potentially larger scale operations. Based on the current need to balance spending and ensure knowledge continuity our study contributes with novel KPIs and success factors for intergenerational knowledge transfer that can help decision makers in building a business case and steering their investments. The KPIs depend on desired outcomes such as Interpersonal Trust and Increased Efficiency – and therefore we see KPIs such as Quality of Relationships and Skill Improvement Score. KPIs also depend on Expected Investments such as Buying Lost Knowledge (e.g., involving rehiring retirees, or external consultants).

Keywords: Tacit knowledge, Business case, Knowledge transfer, Management tools, Quantification, ROI

1. Introduction

The sharing and transfer of knowledge has been practiced and researched for generations (Grant, 1996). The advent of digital tools facilitates this process – up to a point. The purpose of this paper is to research best practices for the *intentional transfer of tacit knowledge* and highlighting opportunities and developments focusing on key concepts such as success factors and possible business cases of these activities.

In view of the shortage of skilled workers in the German labor market and the increasing numbers of experts reaching the legal retirement age and leaving the companies, successful knowledge continuity across generations has become more crucial for the competitiveness of organizations (Rui and Ju, 2022). Decision makers faced with a potentially critical amount of knowledge loss might find parameters and tools how their organization might benefit from a more curated approach to a topic that is gaining in importance.

For our research we follow Burmeister et al.'s (2020) definition of knowledge *transfer* as "…a communicative process during which at least two individuals interact such that one individual can receive and utilize the knowledge that was shared by another individual…" (Burmeister, Wang and Hirschi, 2020). We postulate that in an organizational context effective *tacit* knowledge transfer builds on the acquired *explicit* knowledge of the junior with the senior sharing their tacit knowledge thus facilitating the development of know-how and the growth of expertise in the knowledge recipient over time.

Our study focuses on a successful transfer of *tacit* knowledge, when the express purpose of this transfer is, to make the senior superfluous. On a factual level Senior and Junior are not in competition for the next promotion as the senior's next career move is retirement. Research continues to highlight that a relationship of trust and

mutual respect of the partners' competences and contributions are a crucial foundation for the transfer of tacit knowledge (Cecchi *et al.*, 2022; Leon, 2023). The generativity motivation (Doerwald *et al.*, 2021) to support the next generation might seem counterintuitive to the building of trust especially in an environment where organizations and seniors strive to prolong the employment of the senior experts – if for the sole reason that "…it is more cost-effective to retain older workers and accommodate accordingly (e.g., by retraining them) than to hire new employees and incur the costs associated with recruiting, training, and socializing them into the workplace…" (North and Fiske, 2015). For a successful relationship the senior's next career move needs to be voluntary and not encouraged by the organization's "rejuvenation strategy".

Research question: What Key Performance Indicators (KPI) could be used to evaluate cost and benefit of Tacit Knowledge Transfer across generations?

This article continues with a methodology section, followed by a section analyzing the publications selected, after that we present the results of the study and end with the discussion and conclusion.

2. Methodology

As a basis for our study, we build on the literature available on this topic applying the PRISMA method (Page *et al.*, 2021). We were especially interested in criteria to measure the success of tacit knowledge transfer, in business cases and evaluations if the methods chosen for intergenerational knowledge transfer met the expectations.

The systematic literature review (SLR) (Saunders, Lewis and Thornhill, 2019) was conducted in the online database Scopus between July and December 2024, based and following up on research conducted between April and November 2024. Papers published and added to Scopus after that date were not included in this article. Only peer reviewed publications in English were evaluated. Due to the dynamic developments in this topic, we focused on publications after 2014 (a ten-year period). The literature we analyzed for our research had to have a business and managerial scope with adult sample groups and focus on private sector industries and services.

For the purpose of this study, we build on the vast and ongoing research on the development of our understanding of *knowledge* - which continues to be refined based on each author`s focus and intention - and we focus on *tacit* knowledge in order to explore the business cases behind the endeavors to transfers this most elusive form of knowledge (or wisdom) (Polanyi and Sen, 2009; de Carvalho *et al.*, 2018; Massingham, 2018; Nonaka and Takeuchi, 2021):

Tacit or implicit knowledge develops over time by repeatedly applying, adding and sharing explicit knowledge in a variety of circumstances, interactions and settings. This enriches the skill set by refining relationship building and sensitivity to context and adds a layer of reflection on the owner's knowledge. For the recipient this is less transparent and takes longer to emulate (Polanyi and Sen, 2009). In this study, we will use the term *tacit* to facilitate reading - we acknowledge the view of authors that postulate that "…'tacit' knowledge is not tacit at all and is regularly articulated in conversation or manifested in gesture, glance, gaze and so on…" (de Carvalho *et al.*, 2018).

Figure 1 and table 1 show the identification, screening and inclusion of studies via Scopus searches - based on the PRISMA flow diagram framework.

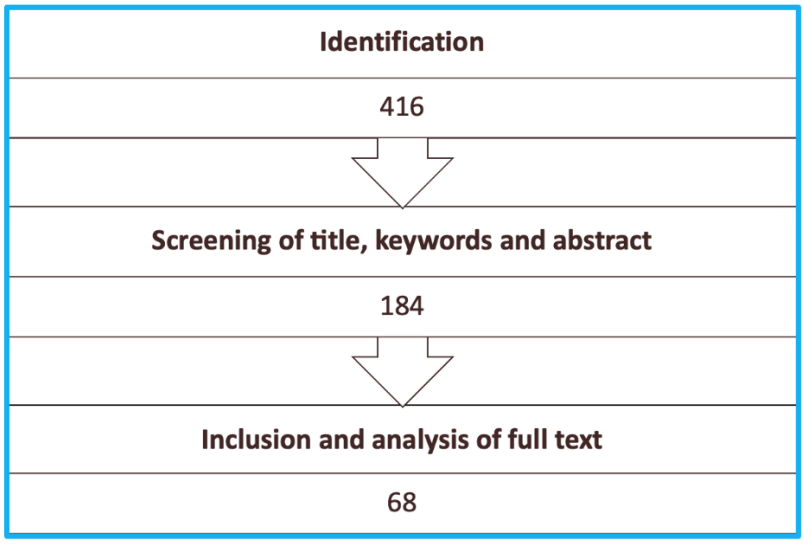

Figure 1: PRISMA Flow Diagram for Identification, Screening and Selection of Sources

Table 1: Identification of studies via Scopus based on the PRISMA flow diagram framework: Keyword combinations that provided results relevant within our research parameters

Identification		Screening	Inclusion
Keyword 1	**Keyword 2**	**Results**	**Relevant**
Knowledge transfer	intergenerational	60	11
	cross-generational	3	
	multigeneration	0	
	older workers	14	14
	senior experts	1	
	implicit knowledge	18	4
Intergenerational	collaboration	22	17
	cooperation	34	
	mentoring	166	9
	expertise	78	5
Tacit knowledge transfer	generation*	7	2
Tacit AND "knowledge sharing"	generation*	13	6
Totals		416	68

3. Literature Review

As our focus is the continued availability of *tacit* expert knowledge once this expert is no longer available within the organization, we are looking at the direction of knowledge *transfer* that is being investigated in the literature we analyzed. Obviously intra-team, inter-team and bi-directional knowledge *sharing* and knowledge *exchange* are vital for organizations and can profit from the findings of our paper. For the purpose of this article, we evaluated them as a side-benefit or supporting conditions for the intentional and successful *transfer* of the experts' *tacit* knowledge into the organization they left.

Various studies have looked at the methodology behind intergenerational knowledge transfer: We analyzed publications that approach this topic from an organizational perspective and a further stream of publications that look at the perspective of the individuals involved.

On an organizational level, Park et al. (2015) approach the transfer of tacit knowledge by analyzing how a parent company transfers knowledge to a joint venture. They find not only that performance is greatly enhanced by the successful transfer of tacit knowledge but that the maturity and preparedness of the receiver has an impact. "… Active transfers of tacit knowledge require both senders and recipients to commit resources to the transfer

process, but they are compensated with important performance improvements…" (Park, Vertinsky and Becerra, 2015). Knowledge transfer is deemed successful when the recipient is able to apply the transferred knowledge with satisfactory results (Scheuer *et al.*, 2023). Nurhas et al. (2022) as well as Perez-Encinas et al. (2021) confirm these findings in their analysis how senior business experts can accelerate the success of young founders (Perez-Encinas *et al.*, 2021; Nurhas, Geisler and Pawlowski, 2022).

This is a significant point as on an organizational level a well-performing Joint Venture benefits the parent company directly. When the knowledge transfer is between individuals the junior's career may benefit due to good performance. If the senior is an employee on their way into retirement the benefits may not be quite as obvious. Park et al. (2015) measured performance in their study on 2 levels: by obtaining individual perceptions and opinions and mapping these with financial data of the entity where available (Park, Vertinsky and Becerra, 2015; Merten, Hütt and Uygun, 2022). Scheuer et al. (2023) as well as Burmeister et al. (2020) looked at the individual benefit/cost equation of both Junior and Senior such as personal ambition versus perceived competence or increased fulfilment at work versus losing credit for work (Burmeister, Wang and Hirschi, 2020; Scheuer *et al.*, 2023).

The following presents an overview of established methods for intergenerational knowledge transfer and the cost/benefits mentioned in the literature:

Mentoring, tutoring, advising, and *coaching* are often being used interchangeably outside academia: to differentiate them is outside the scope of this article as here we are looking at the similarities regarding investments. They are understood as dyadic 1:1-formats that support the receiver in acquiring explicit and/or tacit knowledge in a more personalized way than classic teaching (Schmidt and Muehlfeld, 2017). For all of these formats the costs vary from the time both participants spend in 1:1 sessions instead of day-to-day work to actual bills external coaches invoice. Just as variable are the benefits of these exchanges - ranging from relationship and network building to getting answers for workday problems (Kaše, Saksida and Mihelič, 2019; Gadomska-Lila, 2020; Zhang and North, 2020; Wikström *et al.*, 2023).

With the focus on *tacit* knowledge, the following approaches are prevalent:

Intergenerational collaboration is seen as an effective and efficient way to offer junior employees an environment to absorb senior experts' tacit knowledge as it promotes engagement and successful communication which benefit the organization (Leon, 2020, 2023; Rui and Ju, 2022; Fedorova *et al.*, 2023; Richards, Becker and Stollings-Holder, 2024).

Role or job shadowing allows to absorb knowledge through observation (Sprinkle and Urick, 2018; Levallet and Chan, 2019; Scheuer and Loughlin, 2019) and "…is particularly effective for the transfer of tacit knowledge by revealing workflows, problem-solving techniques, decision-making processes, and interpersonal dynamics. Additionally, job shadowing encourages interactions with professionals across different departments and levels of seniority, helping to build networks throughout the organization. This can lead to valuable insights into the company's culture, bridging generational gaps, and fostering a more inclusive and collaborative workplace…." (OECD, 2024).

Leon offers *storytelling* as a powerful tool in cross-generational knowledge sharing (Leon, 2020) as it provides context, creates emotional connections, and captures complex information in an easily digestible format, making it more memorable and relatable which the Serious Games industry puts into practice (Kampa, Haake and Burelli, 2016). Researchers agree that Serious Games can currently only complement other formats of knowledge transfer as their quality and acceptance are still very diverse (Pfeiffer *et al.*, 2020; Allal-Chérif, Lombardo and Jaotombo, 2022; Al-Rayes *et al.*, 2022; Acampora *et al.*, 2023; Venemyr, 2024).

This portfolio of practices reflects that depending on the specific form of tacit knowledge different approaches might be appropriate and that individuals have different preferences to acquiring knowledge (Sprinkle and Urick, 2018).

4. Results and Contribution

There is an apparent gap in the literature regarding the quantifiable investment and outcome of tacit knowledge transfer. The aforementioned existing tools seem default measures and existing studies into their effectiveness either look at the costs OR at the benefits - a gap we seek to fill by proposing KPIs that could contribute to measure the Return on Investment (ROI) of Tacit Knowledge Transfer programs.

Suggested KPIs to evaluate cost and benefit of Tacit Knowledge Transfer across generations

Building on the findings from our Literature Review, we suggest the following KPIs to capture the social and financial benefits of tacit knowledge transfer from senior employees. We suggest KPIs for measuring both investment and benefits, especially focusing on quality metrics. Hence, tables 2 and 3 show Desired Outcomes and Expected Investment of Intergenerational Tacit Knowledge Transfer respectively.

Table 2: Desired Outcome of Tacit Knowledge Transfer

Desired Outcome	KPI	Item
Documented, retrievable and applied Tacit Knowledge	Knowledge Application Rate	Measure how often Juniors apply the tacit knowledge shared by Seniors in their work
	Knowledge Retention Score	Assess Juniors' ability to recall and explain key concepts shared by Seniors over time
	Quality Improvement	Calculate the reduction in errors or need for rework in Juniors' output following Tacit Knowledge Transfer
Interpersonal Trust	Quality of Relationships	Assess the strength and effectiveness of Senior/Junior relationships through surveys and feedback as trust is a known accelerator
Improved Team Collaboration	Team Effectiveness Score	Use team performance metrics and peer evaluations to measure improvements in collaboration post-Tacit Knowledge Transfer
Enhanced Employee Satisfaction	Employee Turnover Rate	Track Employee Satisfaction KPIs that can be linked to Tacit Knowledge Transfer programs
	Career Progression Rate	Track the percentage of Juniors who receive promotions or take on increased responsibilities within a specified timeframe after the program
Established Knowledge Transfer Culture	Program Completion Rate	Percentage of Senior/Junior pairs who complete the full program or meet all program requirements
	Cross-departmental Collaboration Index	Measure the increase in initiatives involving employees from different departments post-Tacit Knowledge Transfer
	Knowledge Sharing Capabilities	Track long-term cross-departmental cooperation post intergenerational projects
Growing Intellectual Capital	Innovation Rate	Track the relevance of new ideas, processes, or solutions developed by Juniors before and after Tacit Knowledge Transfer
	Revenue from New Initiatives	Track the financial impact of new products, services, or processes developed as a direct result of Tacit Knowledge Transfer insights
Increased Efficiency	Skill Improvement Score	Measure the increase in specific skills targeted by the Tacit Knowledge Transfer program through pre- and post-program assessments
	Problem-Solving Efficiency	Measure the time taken to resolve complex issues before and after implementing Tacit Knowledge Transfer programs
Increased Productivity	Task Completion Improvement	Measure the increase in the number of relevant tasks completed or the reduction in time taken to complete specific tasks post-Tacit Knowledge Transfer (higher relevance of completed tasks is an indicator that the junior can better asses the context of tasks)

Table 3: Expected Investment for Tacit Knowledge Transfer

Expected Investments	KPI	Item
Buying Lost Knowledge	Knowledge accessibility	Measure the cost for buying the lost knowledge (e.g. rehiring retirees, external consultants)
Long-term Knowledge Retention Investments	Sustainability of Knowledge Transfer	Assess how well Juniors retain and apply knowledge when needed
Lost Knowledge Costs	Knowledge Retention	Assess root-cause for problems in the field and the cost for solving them; map with lost knowledge
	Employee time invest	document team hours spent in knowledge transfer sessions

Expected Investments	KPI	Item
Program Development / Design / Deployment	staff time invest	document staff hours spent pre-program in selecting and matching knowledge transfer participants; potentially mentoring during the program and post-program assessing the program's implementation and impact

To be able to apply KPIs to steer any intergenerational knowledge transfer investment decisions organizations need to establish a clear baseline for each KPI and make impact factors and interdependencies transparent. In addition to regular internal progress reviews and feed-back organizations should consider comparing results against industry benchmarks and the organization's specific goals.

5. Discussion in View of the Literature

Tacit knowledge is considered to be very valuable (Dalkir, 2020) and seen as a strategic advantage in competitive markets (Pizzo *et al.*, 2022) though authors struggle to quantity that value. Even studies that argue for strategies and methods for successful tacit knowledge transfer (Chuang, Jackson and Jiang, 2016) or link the loss of tacit knowledge to declining customer and supplier relationship (Massingham, 2018) are not providing data for financial implications. A study that continues to be quoted dates from 2004: "According to International Data Corporation [IDC], Fortune 500 companies relinquish over $31.5 billion a year because they fail to distribute knowledge" (Ibrahim *et al.*, 2014; Wang, Zuo and An, 2017). We were not able to find this original study nor any updates from International Data Corp. or other sources (research which is apparently not open source nor readily available).

Research highlights the amplifier effect senior experts can have on junior colleagues regarding problem-solving approaches and successful cooperative behavior (Schniter and Shields, 2014; Kuyken, Ebrahimi and Saives, 2018; Fedorova *et al.*, 2023; Richards, Becker and Stollings-Holder, 2024), though measuring the benefits of the younger employee to be independent faster and more successful is challenging (Levallet and Chan, 2019; Wikström *et al.*, 2023).

Cecchi et al. (2022) document that in R&D focused environments managers actively encourage social interaction to support building relationships that facilitate the transfer of tacit knowledge (Cecchi *et al.*, 2022). Missing the opportunity to transfer tacit knowledge may result in younger employees spending more time and making possibly costly mistakes while building their own (Levallet and Chan, 2019; Kamps *et al.*, 2024). As this might cause frustration among the younger employee Burmeister et al. (2019) present data that links successful knowledge transfer to the intention to remain in the organization (Burmeister, Wang and Hirschi, 2020). This might be a valuable indicator for organizations that want to improve the KPIs of asset retention and fluctuation and reconsider the cutting of programs (Leon, 2020).

We perceive that with the proposed KPIs more attention will be given to the benefits of effective tacit knowledge transfer. Our new ideas, in our new context, could have a significant impact on how the subject is addressed in the future. KPIs are a useful management tool (see for example Farris et al., 2009) however we have not seen them applied in such a way before– to quantify an intangible asset - which tacit knowledge is (Farris *et al.*, 2009).

6. Conclusion

This research has addressed a critical and increasingly urgent challenge faced by organizations: the transfer of tacit knowledge from senior experts to their junior colleagues. Depending on the specific situation, focus and corporate identity an organization can choose from any number of methods for tacit knowledge transfer which all have their own benefits and drawbacks. As it is a challenging endeavor to quantify the cost of knowledge loss for specific organizations or projects, there is no template for a "most cost-effective approach" as the consequences of a senior employee leaving an organization go beyond the loss of specialized knowledge and the cost of training new employees. Tacit knowledge loss might only become apparent in the long run and effects might not always be able to be isolated to the lack of specific tacit knowledge.

Through an extensive literature review, this study highlights the absence of a comprehensive framework or standardized measurement approach capable of quantifying both the investment and returns of tacit knowledge transfer initiatives. The lack of robust metrics continues to make it difficult for organizations to justify resource allocation toward these programs and fully evaluate their financial and social impacts.

This study proposes KPIs specifically designed to capture both financial and social aspects associated with tacit knowledge transfer. Key Performance Indicators (KPIs) developed in this research cover critical dimensions such

as program completion rates, trust and relationship quality, knowledge application rates, innovation rates, and improvements in skill levels and efficiency. Equally important are the short-term costs of knowledge transfer initiatives, potential expenses related to reacquiring lost knowledge, and long-term investments necessary to sustain knowledge continuity.

Furthermore, the proposed framework places significant emphasis on the broader organizational impacts of successful tacit knowledge transfer, emphasizing enhanced employee satisfaction, improved team collaboration, accelerated career progression for junior employees, and strengthened organizational resilience. Financial outcomes, notably increased productivity, reduced errors, and innovation-driven revenue growth, are also systematically addressed, providing a comprehensive perspective on the strategic value of intergenerational knowledge initiatives.

By reflecting their own practices against the best practices summarized in this article, and the suggested KPIs organizations can take stock regarding the decisions that drive their own organization and develop actionable steps to enhance Senior/Junior knowledge transfer programs and improve the business cases behind them.

In conclusion, this research equips organizations with both a theoretical understanding and practical tools to navigate the complexities of tacit knowledge transfer. By applying the proposed Business Case approach and KPIs, organizations can better measure, understand, and optimize their investments, ensuring knowledge continuity, sustained competitive advantage, and robust organizational resilience into the future.

A limitation of our study is that it is only based on one database, and not several, as some authors suggest should be done. Albeit Scopus as a main social sciences database was seen to be a sufficient base for our study, especially as WoS has much duplication and overlap with Scopus.

Future research avenues identified in this paper include exploring the potential role and effectiveness of advanced technological solutions, such as Artificial Intelligence and Serious Games, in facilitating tacit knowledge transfer. These technologies hold promise for complementing traditional methods and potentially reducing the costs and enhancing the scalability of tacit knowledge transfer. Hence, more studies in the area are necessary.

Acknowledgements

The authors gratefully acknowledge the University of Aveiro, Aveiro, Portugal, for providing access to an innovative and inspiring international research community. We also extend our sincere thanks to ECKM 2025 for hosting this conference and enabling valuable engagement within this community.

Ethical Declaration: All information needed is properly disclosed and no human subject data collection is involved in this research.

AI declaration: ChatGPT 4.0 was used for text optimization only and to make the flow of the text better and more formal.

References

Acampora, G. *et al.* (2023) 'A Serious Mixed-Reality Game for Training Police Officers in Tagging Crime Scenes', *Applied Sciences*, 13(2), p. 1177. Available at: https://doi.org/10.3390/app13021177.

Allal-Chérif, O., Lombardo, E. and Jaotombo, F. (2022) 'Serious games for managers: Creating cognitive, financial, technological, social, and emotional value in in-service training', *Journal of Business Research*, 146, pp. 166–175. Available at: https://doi.org/10.1016/j.jbusres.2022.03.083.

Al-Rayes, S. *et al.* (2022) 'Gaming elements, applications, and challenges of gamification in healthcare', *Informatics in Medicine Unlocked*, 31. Available at: https://doi.org/10.1016/j.imu.2022.100974.

Burmeister, A., Wang, M. and Hirschi, A. (2020) 'Understanding the motivational benefits of knowledge transfer for older and younger workers in age-diverse coworker dyads: An actor–partner interdependence model.', *Journal of Applied Psychology*, 105(7), pp. 748–759. Available at: https://doi.org/10.1037/apl0000466.

de Carvalho, A.F.P. *et al.* (2018) 'Of Embodied Action and Sensors: Knowledge and Expertise Sharing in Industrial Set-Up', *Computer Supported Cooperative Work (CSCW)*, 27(3–6), pp. 875–916. Available at: https://doi.org/10.1007/s10606-018-9320-6.

Cecchi, M.A. *et al.* (2022) 'How COVID-19 Impacted the Tacit Knowledge and Social Interaction of Global NPD Project Teams', *Research-Technology Management*, 65(2), pp. 41–52. Available at: https://doi.org/10.1080/08956308.2022.2020566.

Chuang, C.-H., Jackson, S.E. and Jiang, Y. (2016) 'Can Knowledge-Intensive Teamwork Be Managed? Examining the Roles of HRM Systems, Leadership, and Tacit Knowledge', *Journal of Management*, 42(2), pp. 524–554. Available at: https://doi.org/10.1177/0149206313478189.

Dalkir, K. (2020) 'The Role of Human Resources (HR) in Tacit Knowledge Sharing', in *Information Diffusion Management and Knowledge Sharing*. IGI Global, pp. 490–512. Available at: https://doi.org/10.4018/978-1-7998-0417-8.ch024.

Doerwald, F. *et al.* (2021) 'Generativity at work: A meta-analysis', *Journal of Vocational Behavior*, 125. Available at: https://doi.org/10.1016/j.jvb.2020.103521.

Farris, P.W. *et al.* (2009) *Key Marketing Metrics*. Wharton School Publishing.

Fedorova, Y. *et al.* (2023) 'Emotional Intelligence profiles and intergenerational collaboration in business', *Journal of Business Economics and Management*, 24(4), pp. 797–817. Available at: https://doi.org/10.3846/jbem.2023.20280.

Gadomska-Lila, K. (2020) 'Effectiveness of reverse mentoring in creating intergenerational relationships', *Journal of Organizational Change Management*, 33(7), pp. 1313–1328. Available at: https://doi.org/10.1108/JOCM-10-2019-0326.

Grant, R.M. (1996) 'Toward a knowledge-based theory of the firm', *Strategic Management Journal*, 17(SUPPL. WINTER), pp. 109–122. Available at: https://doi.org/10.1002/smj.4250171110.

Ibrahim, R. *et al.* (2014) 'Engaging Capability Training in Serious Game Technology for Delivering Industrialized Construction', in *Computing in Civil and Building Engineering (2014)*. Reston, VA: American Society of Civil Engineers, pp. 2095–2102. Available at: https://doi.org/10.1061/9780784413616.260.

Kampa, A., Haake, S. and Burelli, P. (2016) 'Storytelling in serious games', in *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*. Springer Verlag, pp. 521–539. Available at: https://doi.org/10.1007/978-3-319-46152-6_19.

Kamps, M. *et al.* (2024) 'Intergenerational transfer of engineering expertise: knowledge continuity management in storm surge barrier engineering', *Built Environment Project and Asset Management* [Preprint]. Available at: https://doi.org/10.1108/BEPAM-10-2023-0179.

Kaše, R., Saksida, T. and Mihelič, K.K. (2019) 'Skill development in reverse mentoring: Motivational processes of mentors and learners', *Human Resource Management*, 58(1), pp. 57–69. Available at: https://doi.org/10.1002/hrm.21932.

Kuyken, K., Ebrahimi, M. and Saives, A.-L. (2018) 'Towards a taxonomy of intergenerational knowledge transfer practices', *The Learning Organization*, 25(2), pp. 81–91. Available at: https://doi.org/10.1108/TLO-02-2017-0023.

Leon, R.-D. (2020) 'Fostering intergenerational learning in the hotel industry: A multiple criteria decision-making model', *International Journal of Hospitality Management*, 91. Available at: https://doi.org/10.1016/j.ijhm.2020.102685.

Leon, R.-D. (2023) 'Human resources practices for intergenerational learning: a systematic literature review', *Knowledge Management Research & Practice*, 21(4), pp. 749–764. Available at: https://doi.org/10.1080/14778238.2022.2035278.

Levallet, N. and Chan, Y.E. (2019) 'Organizational knowledge retention and knowledge loss', *Journal of Knowledge Management*, 23(1), pp. 176–199. Available at: https://doi.org/10.1108/JKM-08-2017-0358.

Massingham, P.R. (2018) 'Measuring the impact of knowledge loss: a longitudinal study', *Journal of Knowledge Management*, 22(4), pp. 721–758. Available at: https://doi.org/10.1108/JKM-08-2016-0338.

Merten, D.C., Hütt, M.-T. and Uygun, Y. (2022) 'A network analysis of decision strategies of human experts in steel manufacturing', *Computers & Industrial Engineering*, 168, p. 108120. Available at: https://doi.org/10.1016/j.cie.2022.108120.

Nonaka, I. and Takeuchi, H. (2021) 'Humanizing strategy', *Long Range Planning*, 54(4). Available at: https://doi.org/10.1016/j.lrp.2021.102070.

North, M.S. and Fiske, S.T. (2015) 'Intergenerational resource tensions in the workplace and beyond: Individual, interpersonal, institutional, international', *Research in Organizational Behavior*, 35, pp. 159–179. Available at: https://doi.org/10.1016/j.riob.2015.10.003.

Nurhas, I., Geisler, S. and Pawlowski, J. (2022) 'An intergenerational competency framework: Competencies for knowledge sustainability and start-up development in the digital age', *Sustainable Development*, 30(6), pp. 1733–1748. Available at: https://doi.org/10.1002/sd.2338.

OECD (2024) *Facilitating knowledge transfer between generations*. Available at: https://www.oecd.org/en/about/terms-conditions.html.

Page, M.J. *et al.* (2021) 'The PRISMA 2020 statement: An updated guideline for reporting systematic reviews', *The BMJ*. BMJ Publishing Group. Available at: https://doi.org/10.1136/bmj.n71.

Park, C., Vertinsky, I. and Becerra, M. (2015) 'Transfers of tacit vs. explicit knowledge and performance in international joint ventures: The role of age', *International Business Review*, 24(1), pp. 89–101. Available at: https://doi.org/10.1016/j.ibusrev.2014.06.004.

Perez-Encinas, A. *et al.* (2021) 'Intergenerational entrepreneurship to foster sustainable development: A methodological training proposal', *Sustainability (Switzerland)*, 13(17). Available at: https://doi.org/10.3390/su13179654.

Pfeiffer, A. *et al.* (2020) 'The use of Blockchain-supported Reward Systems for Knowledge Transfer between Generations', in A. Garcia-Perez and L. Simkin (eds) *Proceedings of the European Conference on Knowledge Management, ECKM*. Academic Conferences and Publishing International Limited, pp. 620–629. Available at: https://doi.org/10.34190/EKM.20.713.

Pizzo, A.D. *et al.* (2022) 'The strategic advantage of mature-stage firms: Digitalization and the diversification of professional sport into esports', *Journal of Business Research*, 139, pp. 257–266. Available at: https://doi.org/10.1016/j.jbusres.2021.09.057.

Polanyi, M. and Sen, A. (2009) *The Tacit Dimension*. The University of Chicago Press.

Richards, M.B., Becker, K.L. and Stollings-Holder, J. (2024) 'Escaping generational conflict: using gamification to examine intergenerational communication & problem-solving', *Review of Managerial Science*, 18(6), pp. 1597–1616. Available at: https://doi.org/10.1007/s11846-023-00669-2.

Rui, H. and Ju, H. (2022) 'How does rapport impact knowledge transfer from older to younger employees? The moderating role of supportive climate', *Frontiers in Psychology*, pp. 1–15. Available at: https://doi.org/10.3389/fpsyg.2022.1032143.

Saunders, M.N.K., Lewis, P. and Thornhill, A. (2019) *Research Methods for Business Students*. 8th edn. PEARSON EDUCATION LIMITED.

Scheuer, C.-L. *et al.* (2023) 'Is competence without humility wasted in building the trust necessary for knowledge transfer in younger/older worker dyads?', *Journal of Knowledge Management*, 27(11), pp. 231–252. Available at: https://doi.org/10.1108/JKM-01-2023-0013.

Scheuer, C.-L. and Loughlin, C. (2019) 'The moderating effects of status and trust on the performance of age-diverse work groups', *Evidence-based HRM: a Global Forum for Empirical Scholarship*, 7(1), pp. 56–74. Available at: https://doi.org/10.1108/EBHRM-01-2018-0008.

Schmidt, X. and Muehlfeld, K. (2017) 'What's so special about intergenerational knowledge transfer? Identifying challenges of intergenerational knowledge transfer', *Management Revue*, 28(4), pp. 375–411. Available at: https://doi.org/10.5771/0935-9915-2017-4-375.

Schniter, E. and Shields, T.W. (2014) 'Ageism, honesty, and trust', *Journal of Behavioral and Experimental Economics*, 51, pp. 19–29. Available at: https://doi.org/10.1016/j.socec.2014.03.006.

Sprinkle, T.A. and Urick, M.J. (2018) 'Three generational issues in organizational learning: Knowledge management, perspectives on training and "low-stakes" development', *Learning Organization*, 25(2), pp. 102–112. Available at: https://doi.org/10.1108/TLO-02-2017-0021.

Venemyr, G.O. (2024) 'Unified Effort: Developing a Mixed Reality Serious Game for Collaborative Crisis Management Training', *European Conference on Games Based Learning*, 18(1), pp. 829–838. Available at: https://doi.org/10.34190/ecgbl.18.1.2669.

Wang, C., Zuo, M. and An, X. (2017) 'Differential influences of perceived organizational factors on younger employees' participation in offline and online intergenerational knowledge transfer', *International Journal of Information Management*, 37(6), pp. 650–663. Available at: https://doi.org/10.1016/j.ijinfomgt.2017.06.003.

Wikström, E. *et al.* (2023) 'Mentoring programmes – building capacity for learning and retaining workers in the workplace', *Journal of Workplace Learning*, 35(8), pp. 732–751. Available at: https://doi.org/10.1108/JWL-01-2023-0003.

Zhang, T. and North, M.S. (2020) 'What Goes Down When Advice Goes Up: Younger Advisers Underestimate Their Impact', *Personality and Social Psychology Bulletin*, 46(10), pp. 1444–1460. Available at: https://doi.org/10.1177/0146167220905221.