The Effect of e-Leadership on Digital Transformation in the Dutch Public Sector

Pascal Ravesteijn,[1] Ton Camu,[2] Paul Morsch,[1]
Guido Ongena[1]

[1] HU University of Applied Sciences, Research Group Process Innovation & Information Systems, Utrecht, Netherland
pascal.ravesteijn@hu.nl, paul.morsch@hu.nl, guido.ongena@hu.nl
[2] HU University of Applied Sciences, Master of Informatics, Utrecht, Netherland
ton.camu@icloud.com

A public sector that adequately makes use of information technology can provide improved government services that not only stimulates business development it also intensifies citizen participation and economic growth. However, the effectiveness of IT and its governance at both national as well as on municipality level leaves much to be desired. It is often stated that this is due to a lack of digital skills needed to manage the IT function and alignment with business. Therefore, the aim of this study is to determine the effect that digital leadership competences and IT capabilities have on digital transformation readiness within Dutch municipalities. Based on an analyses of survey data from 178 respondents we recommend municipalities to implement a range of activities that all are related to realize the ability to constantly apply strategic thinking and organizational leadership to exploit the capability of Information Technology to improve the business.

Keywords: public sector, municipalities, digital leadership, IT capabilities, digital transformation

University of Maribor Press

DOI https://doi.org/10.18690/um.fov.4.2023.23
ISBN 978-961-286-751-5

1 Introduction

The change toward a public sector that adequately makes use of the advantages that information technology has to offer to optimize processes and services has been going on for many years. Dunleavy at al. (2006) already stated that a shift is needed toward "digital-era governance" that is realized by '*reintegrating functions into the governmental sphere, adopting holistic and needs-oriented structures, and progressing digitalization of administrative processes*' (Dunleavy et al., 2006). In recent years, the Dutch government has been investing more effort in digital transformation to improve its services that are vital towards society (Blacquière et al., 2021). Several studies show that improved government services through digitization not only stimulate business development it also intensifies citizen participation and economic growth (Alvarenga et al., 2020, Alnuaimi et al., 2022). Other benefits that are often mentioned are: better transparency and accountability, improved access to government data, increased support for innovation, a more responsive supply chain, and support for environmental initiatives (Alnuaimi et al., 2022). However, the effectiveness of IT and its governance at both the national as well as on municipality level leaves much to be desired (Elias et al., 2015). Within the public sector implementation of management of information systems causes issues regarding coordination between organisational units and achieving organisational goals (Broadbent et al., 1989). The IT function of an organisation needs to be managed and aligned between business and technology focused IT departments as it is regularly the missing link between the often artificial boundaries within government organisations (Njanka et al., 2021). However, for successful digital transformation, it is also necessary for managers and employees to have the required digital competences. Ravesteyn & Ongena (2019) stated that e-leadership competences derived from the European e-competence framework (e-CF) have a positive significant effect on digital transformation. Furthermore, Nwankpa & Roumani (2016) found that IT capabilities have a positive effect on digital transformation. Based on this the objective of the study described in this paper is to determine the effect that digital leadership competences and IT capabilities have on digital transformation readiness within Dutch municipalities.

The remainder of this paper is structured as follows, after an overview of the theoretical background in the next section we describe the research approach (section 3) and the results of our analyses in section 4. Practical recommendations

that can be implemented by municipalities are discussed in section 5 and the paper ends with conclusions in section 6.

2 Theoretical background and conceptual model

Digital transformation in municipalities is not just about digitising paper-based work processes but about a change of methods and communication that will improve the efficiency and service quality of the organization by improving transparency, lead times and reducing the phenomenon of being 'pushed from pillar to post' (Layne & Lee, 2001; Lindgren et al., 2019). Digital transformation involves the use of digital capabilities and technologies to influence different aspects of the organisation to create value. It is important to understand specifically how different types of digital technologies, in combination with capability, influence certain aspects of the organisation (Morakanyane et al., 2017). In addition, digital transformation is an evolutionary process whereby digital technologies and skills are deployed to add value to business models, operational processes and to customer experiences (Morakanyane et al., 2017). Due to a lack of shared strategic vision, empowerment, and innovation the strategic contribution of the IT-function to its business counterpart is less effective within the ecosystems of municipalities (Elias et al., 2015). IT is not merely instrumental in cost reduction, but it is a business enabler that adds value to the organisation (Njanka et al., 2021). Working towards digital transformation there is a shortage of administrative skills, data availability, a lack of resources, a lack of technological capabilities (Alnuaimi et al, 2022) and a lack of competences (Elias et al., 2015; Hüsing, 2013). In a survey among Dutch public administrations, Tangi et al. (2021) provide insight into their transformation efforts and find that the public bodies that were studies only act on exogenous input and that there is no sense of urgency other than sufficient external pressure.

The European Union recognised the lack in IT related competences and therefore in the Malmö (European Union, 2009) and Tallinn (European Union, 2017) declarations 32 participating countries unanimously adopted an e-Governance initiative to develop digital leadership skills for civil servants at all levels. However, there is no common understanding on what entails digital leadership. Klein (2020) defined characteristics of digital leadership catagorized into three groups: digital business, social attitude, and general mindset. Though, none of the listed characteristics seem to be related to technical skills. In contrast, McCarthy, Sammon

& Alhassan (2021) identified eight digital transformation leadership characteristics that contain both business oriented (digital strategist, digital culturalist, customer centrist, organisational agilist, business process optimizer, and digital workplace landscaper) as well as more technical (digital architect, and data advocatte) characteristics. Looking at the European e-Competence Framework standard (e-CF, 2019; NEN, 2018) we find 30 generic roles and 41 competences that are defined which contribute to uniform development and common principles for competence development for ICT professionals. Ravesteyn and Ongena (2019) used the e-CF competences of the Digital Transformational Leader Role to examine the effect on IT Capabilities and Digital Transformation readiness within organizations. These competences, with business and technical orientation, are Business Plan Development (A3), Architecture Design (A5), Innovating (A9), Business Change Management (E7), Information Systems Governance (E9)[1]. Given the fact that the e-CF standard is adopted by Dutch government we have selected this role and corresponding competences for this study.

That IT Capabilities have a positive effect on digital transformation readiness is shown in earlier research by Lu and Ramamurthy (2011), and Nwankpa and Roumani (2016). Lu and Ramamurthy (2011) conceptualise IT capabilities as a latent construct that is reflected in three dimensions. First, IT infrastructure; the ability of an organisation to deploy IT-based managed data services, its architecture and network services in addition to managing the application portfolio and services delivered. Second, IT business spanning; the ability of an organisation's management to leverage IT infrastructure in support of business objectives (Lu & Ramamurthy, 2011; Mao et al., 2015). And finally, proactive stance, the ability of an organisation to actively explore ways to embrace IT innovations that contribute to its business objectives (Lu and Ramamurthy, 2011). As earlier studies have found positive relations but didn't explicitly do research in the context of government organizations this study focuses on municipalities to help them better prepare for digital transformation.

Derived from the literature our conceptual model (figure 1) has three reflective exogenous latent constructs related to IT Capabilities: 1) IT Proactive Stance, 2) IT Infrastructure, and 3) IT Business Spanning. Furthermore, digital leadership consists

[1] The code between brackets refers to the competence label in the e-CF framework.

of five formative exogenous latent constructs: 1) Innovating, 2) Architecture Design, 3) Business Plan Development, 4) Business Change Management, and 5) Information Systems Governance. Finally, the endogenous construct is Digital Transformation.

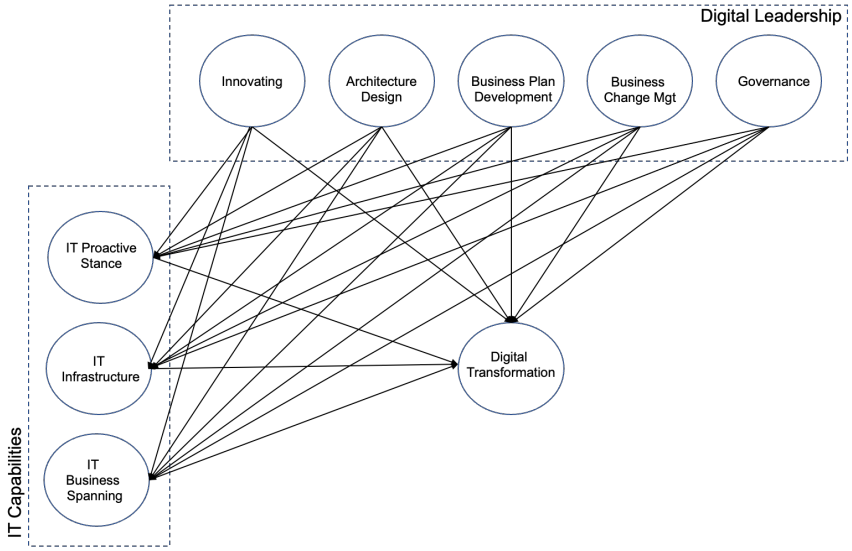

Figure 1: Conceptual Model

As the objective of our research is to determine the effect that digital leadership competences and IT capabilities have on digital transformation readiness within Dutch municipalities the following hypotheses were formulated in line with the conceptual model:

H_1: Digital leadership competences have a positive effect on digital transformation.

H_2: IT capabilities have a positive effect on an organization's digital transformation.

3 Research Method

To investigate the influence of the e-leader towards the relationship between IT capabilities and digital transformation a quantitative research method was used that emphasises the quantification of the data collection and provides for analysis at the

ordinal level. In the operationalization of this research, the existing e-competence framework has been used for collecting data in Dutch municipalities. The questionnaire, sent to over 1800 civil servants, contained all the constructs of the conceptual model which are measured using multiple items. As there were seven respondents with too many missing values and one that scored 1 on each question, the number of usable respondents after cleaning the dataset was 178. Respondents worked across different sizes of municipalities based on the number of employed persons (table 1). The period of data collection was between February 14th, 2022, and May 30th, 2022.

Table 1: Municipality size

	Sample (N=178)	**Proportion** (%)
Municipality size (number of employees)		
Less than 250	42	23.6%
250-999	90	50.6%
1000-4999	35	19.63%
Above 5000	11	6.17%

For this study, both business stakeholders and ICT stakeholders were invited to participate. Unfortunately, the municipal government has no uniformity regarding job titles, distribution of work and mandate (De Tuya et al., 2020). Therefore, to determine the target group, the most common job roles that are responsible and/or bear co-responsibility for digital transformation-related subjects were sought in the immediate vicinity of the researchers. From an inventory within 8 municipal organisations, 18 roles were frequently encountered. Participation requests were therefore sent to the following job roles: IT director, ICT manager, manager I&A, IV manager, CIO, alderman IT/IS, functional manager, technical manager, Information consultant, ICT director, Service Level Manager, CISO, Tiso (technical information security officer), data protection officer, municipal secretary, IT director, transition manager. The initial low response rate was partly mitigated by requesting some of the respondents to forward the request for participation within their own organisation towards the target group. This means that a request for snowball sampling was also used for approximately 25% of the invitations (Baarda et al., 2021).

In regard to the survey (containing 47 questions in total), questions on digital transformation and IT capabilities are taken from Nwankpa & Roumani (2016) who derived them from different studies: 4 on Infrastructure (Bharadwaj et al., 2000; Ross et al. 1996; Weill et al., 2002), 4 on Business Spanning (Bharadwaj et al., 2000; Mata et al., 1995), 4 on Proactive Stance (Lu & Ramamurthy, 2011; Weill et al., 2002), and 9 related to Digital Transformation (Aral & Weill, 2007). Questions (21) regarding Digital Leadership competencies have been reused from Ravesteyn and Ongena (2019). Besides this five general questions were posed to determine size of the organization (#employees and population), funtion of the respondent, and worklevel (strategic, tactic, operational).

The questions were presented via a 7-point Likert scale (Taherdoost, 2019). Across the entire data set (after cleaning) there were 60 missing values and as there was no more than 5% missing in any individual question we opted for the option 'mean replacement' during analysis in SmartPLS (Hair et al., 2021).

4 Results

4.1 Evaluation of Measurement Model

Given that it places less of a burden on the measurements and normal distribution (Gefen, et al., 2000; Hair, et al., 2011), partial least squares (PLS) is employed to evaluate the model (Chin, 1998). To evaluate the statistical significance of the loadings and the path coefficients, a bootstrap approach was performed (Hair et al., 2021). A non-parametric method of estimation called 'bootstrapping' involves resampling the original data with replacement in order to estimate each parameter in the PLS model (Chin, 2001). Prior to evaluating the structural model and testing the hypotheses, the measurement model is assessed to determine its reliability and validity using the software SmartPLS (Ringle et al., 2015).

4.1.1 Reflective Constructs

As shown in Table 2, Cronbach's alpha, Composite reliability and Average variance extracted (AVE) show that the internal consistency and convergent validity requirements are met. Also, the outer loadings are between 0.785 and 9.41 so meet the rule of thumb >0.7 hence all items can be retained.

Table 2: Construct reliability and validity

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Digital Transformation	0.942	0.943	0.963	0.897
IT Business Spanning	0.917	0.922	0.942	0.802
IT Infrastructure	0.831	0.838	0.887	0.662
IT Proactive Stance	0.919	0.921	0.943	0.805

The Fornell-Larcker criteria to assess discriminant validity is met (Fornell & Larcker, 1981) and this is also true for the assessment of cross-loadings. Finally, we used the heterotraitmonotrait ratio (HTMT) to accurately assess discriminant validity as there is discussion about whether the first two methods are effective in empirical applications (Franke & Sarstedt, 2019; Henseler, Ringle, & Sarstedt, 2015).

Based on Bootstrapping with 10,000 samples and a 0.05 significance level (one-sided) table 3 shows that discriminant validity is established as HTMT ratios are less than 0.90 and even below the more conservative threshold of 0.85 (Henseler, Ringle, & Sarstedt, 2015) therefore we conclude that the reflective measures are valid and can be used as a basis for further analysis.

Table 3: Heterotrait-monotrait ratios

		BS	INF	PS	DT
BS	Business Spanning				
INF	Infrastructure	0.772			
PS	Proactive stance	0.684	0.654		
DT	Digital Transformation	0.553	0.584	0.744	

4.1.2 Formative Constructs

To evaluate our formative measurement model (i.e. the constructs for digital leadership), we first test for possible collinearity issues. For this, we use the variance inflation factor (VIF) for which values of 5 or higher indicate significant collinearity issues (Hair, Risher, et al. 2019). We found that all VIF values are below the threshold of 5 therefore we conclude that there are no critical levels of collinearity. Subsequently, we used bootstrapping to test the significance and relevance of the outer weights of our model. All the weights present satisfactory significance levels except two. Items A5_2 of the Architecture Design construct and E7_2 of the Business Change Management construct are marked non-significant. However, when an indicator's weight is not significant, but the corresponding item loading is relatively high (>=0.50), or statistically significant, the item can be retained (Hair, Hult, Ringle, & Sarstedt, 2021). Since the loadings of A5_2 and E7_2 are respectively 0.847 and 0.800 both with p-value 0.000 we decided not to remove these items from the model.

4.2 Evaluation of Structural Model

We examined the significance and relevance of the structural model relationships. Here we not only discuss the significant direct effects but also any indirect effects on the endogenous construct of Digital Transformation (see figure 2) as the goal of our study is to advise municipalities on how to improve their readiness for digital transformation.

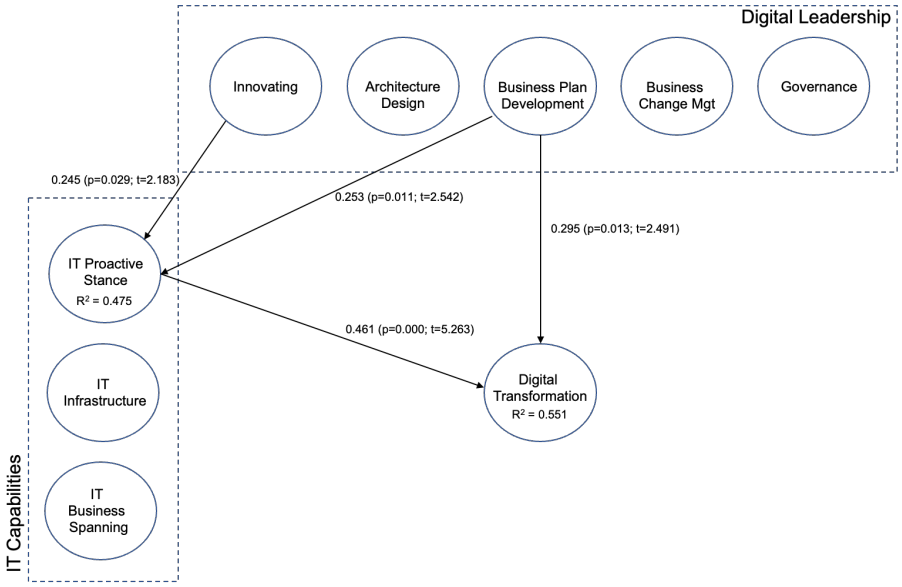

Figure 2: Estimated relationships of structural model

If we look at the relevance of the constructs, we find that from the digital leadership constructs Business Plan Development ($\beta = 0.295$, $t = 2.491$, $p < 0.013$) is significant while for the IT capability constructs the IT Proactive Stance path ($\beta = 0.461$, $t = 5.263$, $p < 0.000$) has a significant relation with Digital Transformation. However, since the IT capability constructs also act as a mediator on the key target variable Digital Transformation, we also need to look at the total effect. We then see that Business Plan Development ($\beta = 0.428$, $t = 3.412$, $p < 0.001$) has a much larger total effect on digital transformation (see table 4). Furthermore, we find that there is also a significant indirect effect of the Digital Leadership competence Innovating on Digital Transformation via Proactive Stance ($\beta = 0.245$, $t = 2.183$, $p < 0.029$).

Table 4: Total and Indirect Effects

	Original sample (O)	**Standard deviation**	***t*-value**	***p*-values**
Total Effects				
Businessplan dev.\DT	0.428	0.125	3.412	0.001
Innovating\IT Proactive Stance	0.245	0.112	2.183	0.029
Specific Indirect Effects				
Businessplan dev.\IT Proactive Stance\DT	0. 117	0.051	2.284	0.022
Innovating\IT Proactive Stance\DT	0.113	0.055	2.055	0.040

The explanatory power of our structural model (figure 2) is determined by examining the R^2 value of the endogenous latent variable Digital Transformation which with R^2=0.551 explains 55.1% of the variance and is considered moderate (Hair, Risher, Sarstedt, & Ringle., 2019). The effect sizes for Business Plan Development and IT Proactive Stance are respectively f^2=0.064 and f^2=0.218.

R^2 however only indicates the model's in-sample explanatory power (Shmueli 2010). To assess the model's out-of-sample predictive power. Shmueli et al. (2016) developed a holdout-sample-based procedure that generates case-level predictions on an item or a construct level to reap the benefits of predictive model assessment in PLS-SEM. To assess the predictive power of the model we executed a *k*-fold cross-validation with PLSpredict. The first step is to check whether Q^2 values are above zero which indicates that the model outperforms the most naïve predicted benchmark (Shmueli, Sarstedt, et al. 2019). This is the case for all the indicators in the dataset used in our study. The second step then is to compare the root mean squared error (RMSE) against the naïve linear regression model (LM) benchmark. An increasingly higher number of indicators that yields lower prediction errors in terms of RMSE when comparing the PLS-SEM analysis to the naïve LM benchmark shows a higher predictive power (Shmueli, Sarstedt, et al. 2019). Concerning the

dependent variable Digital Transformation two PLS-SEM RMSE's values are higher than LM RMSE's (indicators DT_1 and DT_2). This indicates that the model has a low predictive power (Shmueli, Sarstedt, et al. 2019). Comparing RMSE's with regard to IT Proactive Stance, IT Business Spanning and IT Infrastructure shows that *all* indicators yield a lower prediction error in the PLS-SEM analysis. This indicates that the model has a high predictive power (Shmueli, Sarstedt, et al. 2019). Based on these analyses we conclude that the overall model has high predictive power and can therefore be used as a foundation for our recommendations to municipalities.

5 Recommendations and Discussion

To provide clear guidelines to municipalities that want to improve the way they use digital technologies to improve services we need to look at the underlying weights of the items in the constructs that we found to have a significant effect. For Business plan development we find that item A3_3 (0.481) scores highest compared to A3_1 (0.306) and A3_2 (0.355). Therefore, we recommend that municipalities should '*constantly apply strategic thinking and organizational leadership to exploit the capability of Information Technology to improve the business'* (A3_3). This confirms the attention for strategy found by McCarthy et al. (2021) who state: "prioritizing digital transformation as a strategic objective by influencing top management to put it top of their agenda" (p.10).

Similarly, for Proactive Stance the item weights are respectively ITCPS_1 (0.280), ITCPS_2 (0.277), ITCPS_3 (0.261) and ITCPS_4 (0.297). Although the items are more evenly weighted, ITCPS_4 '*We constantly seek new ways to enhance the effectiveness of IT use*' is rated highest and should therefore be a process that municipalities internalize. Furthermore, the importance of a focus on innovation (ITCPS_1) '*To constantly keep current with new information technology innovations'* supports the notion by Klein (2020) who found that "the most distinguished leadership characteristic in the era of digital transformation [..] is to be innovative visionary" (p.895). Another capability that municipalities should emphasize is to make sure to '*have people that are capable of and continue to experiment with new IT as necessary*' (ITCPS_2), which coincides with the "digital talent scout" characteristic mentioned by Klein (2020). Also important is the need to '*Create a climate that is supportive of trying out new ways of using IT*' (ITCPS_3), and this corresponds with the "digital culturalist" characteristic of

digital transformation leadership found by McCarthy et al. (2021). Lastly, we also found a significant indirect effect of the Innovating competence on Digital Transformation via Proactive Stance. Looking at the underlying items we find that A9_1 (0.599) has the highest score compared to A9_2 (0.463). Even though the Innovating competence seems to be less important in this study (compared to Klein (2020)) it is worth mentioning as the underlying items are clearly in support of A3_3 and ITCPS_4 as the related principles that municipalities should adopt are '*to constantly apply independent thinking and technology awareness to lead the integration of disparate concepts for the provision of unique solutions*' (A9_1), and '*to constantly challenge the status quo and provide strategic leadership for the introduction of revolutionary concepts*' (A9_2).

Finally, what we didn't find in this study is an effect of the architecture design competence even though in the literature study by McCarthy et al. (2021) the "digital architect" characteristic was the second most found characteristic after "digital strategist".

6 Conclusion

With this study, we tried to determine the effect that digital leadership competences and IT capabilities have on digital transformation readiness within Dutch municipalities. We found that from the digital leadership competences only Business Plan Development had a direct effect on Digital Transformation while Innovating had an indirect effect via the IT Proactive Stance capability, which by itself also has a direct effect on Digital Transformation. Based on this we can state that the hypotheses we formulated are accepted for only some of the underlying constructs. While we advise municipalities to implement a range of activities that should enable them to 'constantly apply strategic thinking and organizational leadership to exploit the capability of Information Technology to improve the business', some final words of caution are necessary. Specifically, the number of respondents from large municipalities was limited so the difference between organization sizes has not been analyzed and might go unnoticed. Furthermore, the sample of respondents contains employees with a wide range of roles, which we haven't analyzed to determine if there are different views amongst specific groups that have traits in common. Similarly, cultural aspects might play a role during digital transformations so the outcomes in other countries might be different. Future studies are needed to provide

more contextual insights into how Digital Leadership competences, IT Capabilities and Digital Transformation interact.

References

Alnuaimi, B. K., Sing, K. S., Ren, S., Budhwar, P., & Vorobyev, D. (2022). Mastering digital transformation: The nexus between leadership, agility, and digital strategy. Journal of Business Research 145, 636-648.

Alvarenga, A., Matos, F., Godina, R., & C. O. Matias, J. (2020). Digital Transformation and Knowledge Management in the Public Sector. Sustainability, 12(14), 5824. https://doi.org/10.3390/su12145824

Aral, S., & Weill, P. (2007). IT assets, organizational capabilities, and firm performance: How resource allocations and organizational differences explain performance variation. Organization science, 18(5), 763-780.

Baarda,B., Bakker, E., T.Fischer,T., Julsing & Vianen. (2021). Basisboek Methoden en Technieken Kwantitatief praktijkgericht onderzoek op wetenschappelijke basis: Vol. Zevende druk (Nummer Sociale methoden en technieken). Noordhoff Uitgevers BV. https://web-p-ebscohost- com.hu.idm.oclc.org/ehost/detail/detail?vid=0&sid=66738126-89fe-453e-9ffc-7d6aa815e62d%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#

Bharadwaj, A.S. (2000). A Resource-Based Perspective on Information Technology Capability and Firm Performance: An Empirical Investigation. MIS Quarterly, 24(1), 169-196. https://doi.org/10.2307/3250983

Blacquière, R., de Groot, M., & Serruys, M. (2021). I-strategie Rijk 2021 – 2025: Doorpakken op digitale transformatie. https://www.digitaleoverheid.nl/document/i-strategie-rijk-2021-2025/

Broadbent, M., Hansell, A., Dampney, N.G., Gilmour, P., Hardy, G. (March 1989) Business Strategic Orientation, Information Systems Strategic Orientation, and Strategic Alignment. International Journal of Information Management

Chin, W.W. (1998). The partial least squares approach to structural equation modeling. In Modern Methods for Business Research, edited by G.A Marcoulides, 1295–1336. Mahwah, N.J: Lawrence Erlbaum Associates.

Chin, W.W. (2001). PLS-Graph user's guide. CT Bauer College of Business, University of Houston, USA, 15, 1-16.

De Tuya, M., Cook, M., Sutherland, M., & Luna-Reyes, L.F. (2020). The leading role of the government CIO at the local level: Strategic opportunities and challenges. Government Information Quarterly, 37(3). https://doi.org/10.1016/j.giq.2017.01.002

Dunleavy, P., Margetts, H., Bastow, S., & Tinkler, J. (2006). New public management is dead: long live digital-era governance. Journal of Public Administration Research and Theory 16, 467-494

E-Competence Framework (e-CF) (2019). A common European Framework for ICT Professionals in all sectors—NEN- EN 16234-1:2019.

European Union (2009). Ministerial Declaration on eGovernment (2009). Accessed on July 20, 2022: https://administracionelectronica.gob.es/pae_Home/pae_Estrategias/pae_lineas_ccooperacion/pae_Cooperacion_Internacional/pae_estrategias_de_administracion_electronica/pae_Ambito_Europeo_- _Las_Declaraciones_Ministeriales.html?idioma=en#.YtfBZy-Qn0o

European Union (2017). Tallinn Declaration on eGovernment at the Ministerial Meeting during Estonian Presidency of the Council of the EU (2017). Accessed on April 15, 2022. https://digital-strategy.ec.europa.eu/en/news/ministerial-declaration-egovernment-tallinn-declaration

Elias, T., Ulenbelt, P., Fokke, M., Bruins Slot, H., & Van Meenen, P. (2015). Parlementair onderzoek naar ICT-projecten bij de overheid. 's Gravenhage: Tweede Kamer. Accessed June 10th 2022:

https://www.tweedekamer.nl/sites/default/files/field_uploads/33326-5-Eindrapport_tcm181-239826.pdf

Fornell, C., & Larcker, D.F. (1981). Evaluating structural equation models with unobservable variables and measurement error. Journal of marketing research, 18(1), 39-50.

Franke, G., & Sarstedt, M. (2019). Heuristics versus statistics in discriminant validity testing: a comparison of four procedures. Internet Research.

Gefen, D., Straub, D.W., & Boudreau, M. (2000). Structural equation modeling techniques and regression: Guidelines for research practice. Communications of AIS 4 (7): 1-77.

Hair, J.F., Hult, G.T.M., Ringle, C.M., & Sarstedt, M. (2021). A primer on partial least squares structural equation modeling (PLS-SEM). Sage publications.

Hair, J.F, Ringle, C.M, & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. Journal of Marketing Theory and Practice 19 (2): 139-152.

Hair, J.F, Risher, J.J., Sarstedt, M., & Ringle, C.M. (2019). When to use and how to report the results of PLS-SEM. European Business Review 31(1), 2-24.

Henseler, J., Ringle, C.M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. Journal of the Academy of Marketing Science 43 (1): 115-135

Huŝing, T., Korte, W. B., Fonstad, N., Lanvin, B., Cattaneo, G., Kolding, M., Lifonti, R., & van Welsum, D. (2013). e- Leadership: E-Skills for Competitiveness and Innovation Vision, Roadmap and Foresight Scenarios Final Report. 180.

Klein, M. (2020). Leadership Characteristics in the Era of Digital Transformation. Business & Management Studies: An International Journal, 8(1), 883–902.

Layne, K., & Lee, J. (2001). Developing fully functional E-government: A four stage model. Government Information Quarterly, 18(2), 122–136. https://doi.org/10.1016/ S0740-624X(01)00066-1

Lindgren, I., Madsen, C.Ø., Hofmann, S., & Melin, U. (2019). Close encounters of the digital kind: a research agenda fort he digitalization of public services. Government Information Quarterly, 36, 427-436.

Lu, Y., & Ramamurthy, K. (2011). Understanding the Link Between Information Technology Capability and Organizational Agility: An Empirical Examination. MIS Quarterly, 35(4), 931-954. https://doi.org/10.2307/41409967

Mao, H., Liu, S., Zhang, J., & Deng, Z. (2016). Information technology resource, knowledge management capability, and competitive advantage: The moderating role of resource commitment. International Journal of Information Management, 36(6), 1062–1074. https://doi.org/10.1016/j.ijinfomgt.2016.07.001

Mata, F. J., Fuerst, W. L., & Barney, J. B. (1995). Information technology and sustained competitive advantage: A resource-based analysis. MIS quarterly, 19(4), 487-505.

McCarthy, P., Sammon, D., & Alhassan, I. (2021): Digital Transformation Leadership Characteristics: A Literature Analysis, Journal of Decision Systems, DOI: 10.1080/12460125.2021.1908934

Morakanyane, R., Grace, A., & O'Reilly, P. (2017). Conceptualizing Digital Transformation in Business Organizations: A Systematic Review of Literature. Digital Transformation – From Connecting Things to Transforming Our Lives, 427–443. https://doi.org/10.18690/978-961-286-043-1.30

NEN (2018). European ICT professionals role profiles – Part 1 – CWA 16458-1. https://www.nen.nl/cwa-16458-1- 2018-en-250293

Njanka, S. Q., Sandula, G., & Colomo-Palacios, R. (2021). IT-Business Alignment: A Systematic Literature Review. Procedia Computer Science, 181, 333–340. https://doi.org/10.1016/j.procs.2021.01.154

Nwankpa, J., & Roumani, Y. (2016). IT Capability and Digital Transformation: A Firm Performance Perspective. ICIS 2016 Proceedings. https://aisel.aisnet.org/icis2016/ISStrategy/Presentations/4

Ravesteyn, P., & Ongena, G. (2019). The Role of e-Leadership in Relation to IT Capabilities and Digital Transformation. 12th IADIS International Conference Information Systems 2019, 171–179. https://doi.org/10.33965/is2019_201905L022

Ringle, C.M, Wende, S., & Becker, J.-M. (2015). SmartPLS 3. Boenningstedt: SmartPLS GmbH. http://www.smartpls.com.

Ross, J.W., Beath, C.M., & Goodhue, D. L. (1996). Develop long-term competitiveness through IT assets. MIT Sloan Management Review.

Shmueli, G. (2010). To explain or to predict? Statistical Science 25 (3): 289-310.

Shmueli, G., Hair, J.F., Sarstedt, M., Cheah, J.-H., Ting, H., Vaithilingam, S., & Ringle, C.M. (2019). Predictive model assessment in PLS-SEM: guidelines for using PLSpredict. European Journal of Marketing 53 (11): 2322-2347.

Shmueli, G., Ray, S., Velasquez Estrada, J.M., & Shatla, S.B. (2016). The elephant in the room: Evaluating the predictive performance of PLS models. Journal of Business Research 69 (10): 4552-4564

Taherdoost, H. (2019). What Is the Best Response Scale for Survey and Questionnaire Design; Review of Different Lengths of Rating Scale / Attitude Scale / Likert Scale; International Journal of Academic Research in Management.

Tangi, L., Janssen, M., Benedettie, M., & Noci Guiliano (2021). Digital government transformation: a structural equation modeling analysis of driving and impeding factors. International Journal of Information Management 60. https://doi.org/10.1016/j.ijinfomgt.2021.102356

Weill, P., Subramani, M., & Broadbent, M. (2002). IT infrastructure for strategic agility. Available at http://dx.doi.org/10.2139/ssrn.317307