

Ready or Not, AI Comes – An Interview Study of Organizational AI Readiness Factors

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Business & Information Systems Engineering (2021)

Appendix (available online via <http://link.springer.com>)

Online Appendix

Appendix I: Theoretical Foundation

Table 2: Literature Overview of Our Theoretical Foundation

Literature stream	Core insights	Key references
Innovation and technology adoption	<ul style="list-style-type: none"> - Innovation adoption is defined as a process with different phases - Within the process, several factors determine the adoption decision - The research investigated factors and antecedents to technology adoption on an organizational level (e.g., DOI and TOE) or acceptance on an individual level (e.g., TAM and TPB) - Theory needs to be tailored to the adoption context 	Chwelos et al. 2001; Davis 1985; Frambach and Schillewaert 2002; Hameed et al. 2012; Oliveira and Martins 2011
Organizational readiness for change	<ul style="list-style-type: none"> - Readiness is a state, which is attained before a specific activity takes place - Precursor condition for implementation of a change such as innovation, technology, etc. - Systematic reviews identify that the organizational readiness construct is not yet well-defined - Discussed factors comprise change valence, change efficacy, and contextual factors 	Armenakis et al. 1993; Helfrich et al. 2011; Rafferty et al. 2013; Shahrabadi and Paré 2014; Weiner 2009
(Digital) readiness in IS	<ul style="list-style-type: none"> - The literature discusses readiness for technology adoption in the context of systems implementation, knowledge management, e-readiness, and Green IT readiness - Organizational readiness affects the probability of successful technology adoption - Readiness is a capability which requires continuous improvement - Typical variables have been employed: financial resources, IT sophistication, management support, trading partner readiness, elapsed time since adoption, organizational culture, communication of goals, individual attitude, commitment - Digital readiness is conceptualized as digital assets, digital capabilities, and digital commitment 	Abdinnour-Helm et al. 2003; Lokuge et al. 2018; Molla and Licker 2005; Nguyen et al. 2019; Snyder-Halpern 2001
AI readiness	<ul style="list-style-type: none"> - The literature on AI adoption and AI readiness is limited to a few qualitative studies - Two main contributions (Alsheibani et al. 2019; Pumplun et al. 2019) gather and list factors within the TOE model which determine AI adoption 	Alsheibani et al. 2018; Pumplun et al. 2019

Appendix II: Overview of Interview Experts

Table 3: Overview of Interview Experts

ID	Interviewee Position	Industry	Company Size	AI Adoption Stage	Duration (minutes)
E01*	Senior Data Scientist	Automotive	<100.000	Continued Use	53
E02*	Director Digital Transformation				
E03	Chief Business Officer	IT	<10	Continued Use	58
E04	Managing Partner	Venture Capital	<50	Awareness	60
E05	IT Architect Enterprise Operations Center & Workload Automation	IT	>100.000	Continued Use	61
E06	Professor for Innovation and Technology Management	Research	<10	Awareness	50
E07	Head of Asset Intelligence Center	Logistics	<50.000	Evaluation	55
E08	Digital Advisor	Software	>100.000	Continued Use	70
E09	Senior Digital Expert	Manufacturing	<25.000	Intention	57
E10	Head of Strategy and Innovation	IT	<50	Continued Use	66
E11	Managing Director	IT	<50	Continued Use	52
E12	Member of the Executive Board	Insurance	<5000	Evaluation	49
E13	Head of Operations	Healthcare	<50	Continued Use	53
E14	Head of Functional Controlling	Pharma & Agriculture	>100.000	Continued Use	56
E15	Director	Automotive	<50	Intention	62
E16	Vice President Core Business Apps	Manufacturing	<25.000	Consideration	56
E17	CIO	Automotive	>100.000	Continued Use	79
E18	Head of IT	Construction	<100.000	Intention	54
E19	Head of Digital Unit	Manufacturing	<5000	Consideration	46
E20	CIO / Vice President IT	Automotive	<100.000	Intention	58
E21	CEO	IT	<50	Continued Use	58
E22	CEO	Automotive	<50	Continued Use	49
E23	CEO	Consulting	<500	Awareness	53
E24	Head of Center of Excellence IT Automation	Manufacturing	<25.000	Consideration	58
E25	CEO	IT	<250	Continued Use	72

* Note that E01 and E02 are respondents from the same company and were interviewed in the same interview meeting

Appendix III: Explicating and Validating the AI Readiness Factors

For a comprehensive AI readiness assessment, we developed indicators with insights from our expert interviews, the literature, and practitioner studies. To the best of our knowledge, the research does not yet provide such detailed indicators. To ensure a rigor approach, we referred to established procedures for scale development (Boateng et al. 2018). Specifically, we paid attention to ensure unambiguity and simplicity and to prevent exceptionally lengthy measures (DeVellis 2017). Thus, our first draft of indicators resulted in 76 indicators that explicated the 23 preliminary AI readiness factors.

Finally, we gathered a focus group of seven AI-related researchers to perform a card-sorting procedure of our categories, factors, and indicators in a joint workshop. Card-sorting assesses the construct validity and identifies ambiguous measures (Moore and Benbasat 1991). Thus, the results helped us to validate our initial categorization and further improve our factors and indicators. We asked the focus group members to assign the randomized indicators to the list of factors and to rate their confidence level in the assignment. One author moderated and discussed personal feedback of the focus group during and after the assignment. This provided us with additional insights into focus group members' understanding and potential areas for improvement.

Overall, the card-sorting scored a hit ratio of 72.74%. Despite mostly satisfying results, the card-sorting also revealed weaknesses in some AI readiness factors (see **Table 4**). Particularly, the average hit ratios of data-related factors (62.43%) were lower compared to non-data-related factors (78.43%). While this is partly dependent on the focus group constellation, we also took measures to account for the received feedback. For instance, we improved the wording of some factors to improve comprehensibility. Further, we restructured all data factors to depict data criteria (i.e. characteristics and their management) instead of a distinction between data characteristics and data management factors. We also improved the indicators' wording to avoid ambiguities. For instance, we replaced the word 'aware' in some indicators to avoid unintended links to the factor 'AI awareness'. In rare instances, we dropped indicators altogether because of particularly low hit ratios or missing AI-specifics. This procedure led to our final compilation of 18 AI readiness factors organized in five categories and operationalized by 58 indicators (see **Table 5**).

Table 4 Card-Sorting Hit Ratios

Factor	Comp	CuAiR	ToMaSu	ProAiAl	FinBud	AiExp	ItInf	AiAwa	Ups	EtaCo	Inno	CollWo	ChaMa	IterDe	DaAmo	DaTy	DaQua	DaAcc	DaFlo	DaCo	DaPre	DaAna	DaPo	Ambiguous	Total Sorts	% Hits	
Comp*	9	1	0	7	0	0	0	6	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	2	28	32.14%
CuAiR	0	23	2	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	28	82.14%
ToMaSu	0	0	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	100.00%
ProAiAl*	0	0	0	18	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	21	85.71%
FinBud	0	0	0	0	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	100.00%
AiExp*	1	0	0	0	1	15	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	21	71.43%
ItInf	0	0	0	0	0	0	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	100.00%
AiAwa*	0	0	0	0	0	1	0	25	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	89.29%
Ups	0	0	0	0	1	0	0	0	23	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	28	82.14%
EtaCo*	1	0	0	1	0	0	0	0	0	17	0	0	0	0	0	0	0	0	0	0	0	0	1	1	21	80.95%	
Inno	1	0	0	0	0	0	0	1	2	0	17	3	1	0	0	0	0	0	0	0	0	0	0	0	3	28	60.71%
CollWo	1	0	2	1	1	2	0	0	0	0	1	13	0	0	0	0	0	0	0	0	0	0	0	0	0	21	61.90%
ChaMa	1	0	1	0	0	1	0	0	0	0	0	0	17	0	0	0	0	0	0	0	0	0	0	0	1	21	80.95%
IterDe*	0	0	0	0	0	0	2	0	0	0	0	2	0	29	0	0	0	0	0	0	0	0	0	0	2	35	82.86%
DaAmo*	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	3	0	6	1	1	0	0	0	0	0	14	14.29%
DaTy*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	6	0	0	0	0	14	57.14%
DaQua	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	16	0	0	2	1	0	0	0	0	21	76.19%
DaAcc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	26	0	0	0	0	1	0	0	28	92.86%
DaFlo	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2	0	0	17	0	0	0	0	0	0	21	80.95%
DaCo*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	12	1	0	0	0	0	21	57.14%
DaPre*	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	2	8	4	0	1	0	28	28.57%
DaAna*	4	0	1	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	1	0	21	57.14%
DaPo*	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0	17	0	0	21	80.95%

Abbreviations

Comp	Compatibility	ItInf	IT infrastructure	ChaMa	Change management	DaFlo	Data flow
CuAiR	Customer AI readiness	AiAwa	AI awareness	IterDe	Iterative development	DaCo	Data collection
ToMaSu	Top management support	Ups	Upskilling	DaAmo	Data amount	DaPre	Data preparation
ProAiAl	Process AI alignment	EtaCo	Ethics and compliance	DaTy	Data type	DaAna	Data analytics
FinBud	Financial budget	Inno	Innovativeness	DaQua	Data quality	DaPo	Data processing
AiExp	AI experts	CollWo	Collaborative work	DaAcc	Data accessibility		

*Factors with changes after card-sorting (renamed, dropped, or restructured with other factors)

Appendix IV: Overview of AI Readiness Categories, Factors, and Indicators

Table 5 Overview of AI Readiness Categories, Factors, and Illustrative Indicators

Abbreviation	Illustrative AI readiness indicators	Key References
<i>Strategic Alignment:</i>	AI adoption needs to be aligned with the overall strategy of an organization. As such, the category <i>strategic alignment</i> is defined as the tight linkage of organizational priorities and processes enabling and supporting this adoption process.	
AiBuPo1 AiBuPo2 AiBuPo3	<u>AI-business potential</u> My organization has business problems and opportunities that are suited to be addressed by AI. AI technologies offer potential benefits for the organization's business. My organization has appropriate methods and procedures for AI use case discovery.	<ul style="list-style-type: none"> E01, E03, E08, E10, E13, E18, E22 Alsheibani et al. 2018; Groopman 2018; Hofmann et al. 2020; PA Office of Administration 2018; Pringle and Zoller 2018; Pumplun et al. 2019
CuAiR1 CuAiR2 CuAiR3	<u>Customer AI readiness</u> My organization's customers are likely to accept AI-integrated offerings. My organization's customers have adequate expectations toward AI-integrated offerings. My organization's customers have error tolerance toward AI-integrated offerings.	<ul style="list-style-type: none"> E03, E08, E11, E24 Groopman 2018; Pumplun et al. 2019
ToMaSu1 ToMaSu2 ToMaSu3	<u>Top management support</u> Top management integrates AI adoption into the strategy of the organization. Top management is willing to actively pursue AI adoption through initiatives and projects. Top management is willing to support bottom-up AI initiatives.	<ul style="list-style-type: none"> E08, E10, E13, E18 Alsheibani et al. 2018; Catalyst Fund 2020; Groopman 2018; Intel 2018; Kruse et al. 2019; Microsoft 2020; PA Office of Administration 2018; Pringle and Zoller 2018; Pumplun et al. 2019
PrAiFit1 PrAiFit2 PrAiFit3	<u>AI-process fit</u> My organization documents and standardizes business processes and operations. My organization is willing to implement new business processes and operations to enable AI-integrated workflows. My organization is willing to reengineer business processes and operations to enable AI-integrated workflows.	<ul style="list-style-type: none"> E09, E11, E16, E24 Groopman 2018; Microsoft 2020; Pumplun et al. 2019
DaDriDM1 DaDriDM2	<u>Data-driven decision-making</u> My organization is capable to create insights with data-driven analytics. The decisions that are made in my organization are based on data-driven insights.	<ul style="list-style-type: none"> E10, E15 Catalyst Fund 2020; Groopman 2018; Microsoft 2020
<i>Resources:</i>	Considering AI's inherent complexity, organizations need dedicated resources to steer the development of related assets, capabilities, and commitment. Thus, the category <i>resources</i> considers AI-related financial, personnel, and infrastructural resources.	
FinBud1 FinBud2	<u>Financial budget</u> My organization has allocated financial resources for AI adoption. My organization is willing to spend financial resources on AI projects with a high amount of risk and uncertainty.	<ul style="list-style-type: none"> E08, E09, E10 Alsheibani et al. 2019; Kruse et al. 2019; Pringle and Zoller 2018; Pumplun et al. 2019
Per1 Per2 Per3	<u>Personnel</u> My organization has employees with AI know-how. My organization has AI specialists who have a deep understanding of AI technologies. My organization has business analysts who possess both domain and AI know-how.	<ul style="list-style-type: none"> E03, E05, E08, E10 Alsheibani et al. 2018; Catalyst Fund 2020; Groopman 2018; Intel 2018; Kruse et al. 2019; Microsoft 2020; PA Office of Administration 2018; Pumplun et al. 2019
ItInf1 ItInf2 ItInf3	<u>IT infrastructure</u> My organization's IT infrastructure facilitates data availability, data accessibility, and data flow. My organization's IT infrastructure can provide processing power for AI workloads. My organization's IT infrastructure is modular and allows for the integration of new applications.	<ul style="list-style-type: none"> E01, E03, E10, E11, E13, E14, E15 Alsheibani et al. 2018; Catalyst Fund 2020; Groopman 2018; Intel 2018; Kruse et al. 2019

<i>Knowledge:</i>	Since AI raises questions regarding the applicability and explainability of underlying intelligent techniques, the category <i>knowledge</i> reflects the adequate understanding and expectations of employees toward AI	
AiAwa1 AiAwa2 AiAwa3	<u>AI awareness</u> Employees in my organization are aware of AI's opportunities. Employees in my organization are aware of how AI works. Employees in my organization have adequate expectations toward AI.	<ul style="list-style-type: none"> • E01, E03, E09, E10, E15, E19 • Catalyst Fund 2020; Kruse et al. 2019; Pringle and Zoller 2018
Ups1 Ups2 Ups3	<u>Upskilling</u> Employees in my organization have access to a wide range of upskilling programs. Employees in my organization are encouraged to learn new skills. Employees in my organization are willing to take part in upskilling programs.	<ul style="list-style-type: none"> • E01, E05, E12, E17, E23, E01, E03, E09, E10, E15, E19 • Groopman 2018; Intel 2018; Microsoft 2020
AiEth1 AiEth2 AiEth3	<u>AI ethics</u> My organization has measures to ensure compliant and ethical conduct. My organization acknowledges that AI poses challenges to algorithmic decisions' explainability. My organization acknowledges that AI requires new measures in order to prevent discrimination and safety violations.	<ul style="list-style-type: none"> • E08, E15, E16 • Catalyst Fund 2020; Groopman 2018; Kruse et al. 2019; Microsoft 2020; PA Office of Administration 2018
<i>Culture:</i>	The category <i>culture</i> considers creating an environment that facilitates an openness toward innovation and change for AI adoption on an organizational and individual level.	
Inno1 Inno2 Inno3	<u>Innovativeness</u> Employees in my organization experiment to improve established assumptions and practices. Employees in my organization are willing to innovate radically. Employees in my organization are willing to innovate rapidly.	<ul style="list-style-type: none"> • E03, E11, E12, E13, E16 • Catalyst Fund 2020; Groopman 2018; Microsoft 2020; Pumplun et al. 2019
CollWo1 CollWo2	<u>Collaborative work</u> My organization has formats and tools to foster collaboration between domain experts, AI specialists, and IT. My organization is willing to facilitate intraorganizational collaboration between domain experts, AI specialists, and IT through new formats and tools.	<ul style="list-style-type: none"> • E05, E12, E18 • Catalyst Fund 2020; Groopman 2018; Microsoft 2020
ChaMa1 ChaMa2 ChaMa3	<u>Change management</u> My organization manages resistance to change effectively. Change champions, multipliers, and consultants facilitate organizational change in my organization. My organization is willing to provide resources and guidance to handle AI-induced change.	<ul style="list-style-type: none"> • E02, E07, E08, E10, E16, E24 • Pumplun et al. 2019
<i>Data:</i>	The category <i>data</i> comprises assets, capabilities, and commitment to ensure high data availability, quality, accessibility, and flow.	
DAvail1 DAvail2 DAvail3 DAvail4 DAvail5 DAvail6	<u>Data availability</u> My organization has extensive amounts of data about resources, processes, transactions, and other events related to my organization. Data about resources, processes, transactions, and other events related to my organization is digitally available instead of paper-based. Data within my organization is available in the form of structured data. My organization has methods and procedures to transform unstructured or semi-structured data into structured data. My organization has data that is relevant for potential AI use cases. My organization regularly identifies and establishes new sources to collect data.	<ul style="list-style-type: none"> • E03, E05, E08, E10, E11, E12, E13, E22, E24 • Catalyst Fund 2020; Groopman 2018; Intel 2018; Kruse et al. 2019; Microsoft 2020; Pringle and Zoller 2018; Pumplun et al. 2019
DaQua1 DaQua2 DaQua3	<u>Data quality</u> Data within my organization represents real-world events. Data within my organization is correct. Data within my organization is complete.	<ul style="list-style-type: none"> • E08, E11, E13, E15, E24 • Catalyst Fund 2020; Groopman 2018; Kruse et al. 2019; PA Office of Administration 2018; Pringle and Zoller 2018; Pumplun et al. 2019

DaQua4 DaQua5 DaQua6	My organization has methods and procedures for anomaly detection. My organization has methods and procedures for data cleaning. My organization has methods and procedures for data quality assurance.	
DaAcc1 DaAcc2 DaAcc3 DaAcc4	<u>Data accessibility</u> Data within my organization is quickly and easily retrievable. Data within my organization is accessible through centralized data sources. Data within my organization is accessible across different departments. Ways to access data within my organization are documented.	<ul style="list-style-type: none"> • E03, E08, E12, E13 • Catalyst Fund 2020; Groopman 2018; Intel 2018
DaFlo1 DaFlo2 DaFlo3	<u>Data flow</u> My organization moves data from its source to its use in an automated manner. In my organization, moving data from its source to its use does not produce data corruption. In my organization, technological bottlenecks do not hamper moving data from its source to its use.	<ul style="list-style-type: none"> • E08, E10, E13, E24 • Catalyst Fund 2020; Groopman 2018

Appendix V: Exemplary AI Readiness Assessment

