Low Code Development Platform Adoption: A Research Model – Appendix

1 Methodology

Identifying influential factors to explain Low Code Development Platforms (LCDP) adoption is critical. Due to the immaturity of LCDP adoption literature, I use existing research on cloud computing (CC) adoption and agile software development methods (SDM) adoption. Using existing CC adoption research is justified, as LCDPs are "cloud services" (Rymer 2017, p. 4) that foster a visual development with declarative techniques to define an application's user interface, business logic, and data models (Totterdale 2018). Furthermore, LCDPs significantly transform the software development process - from an IT-driven process with manual coding to a business-driven process using visual drag-and-drop functions (Al Alamin et al. 2021; Beranic et al. 2020). Hence, one must also consider findings from agile SDM adoption literature. I purposefully selected the adoption of agile SDM, as in agile application development also non-professional IT personnel (e.g., regular business employees) are involved in the development process.

It is critical to select influential factors to create a research model that analyses the combinatorial effect of factors on an outcome (Park et al. 2020). To select influential factors for this study, I used the guidelines provided by Jeyarj et al. (2006), who propose a method to compare the effect of independent factors across empirical studies. The methodology includes three steps, as shown in Figure 1. For this study, I adjusted the methodology to account for the specifics of the research project, i.e., the immaturity of the research field on LCDP adoption.

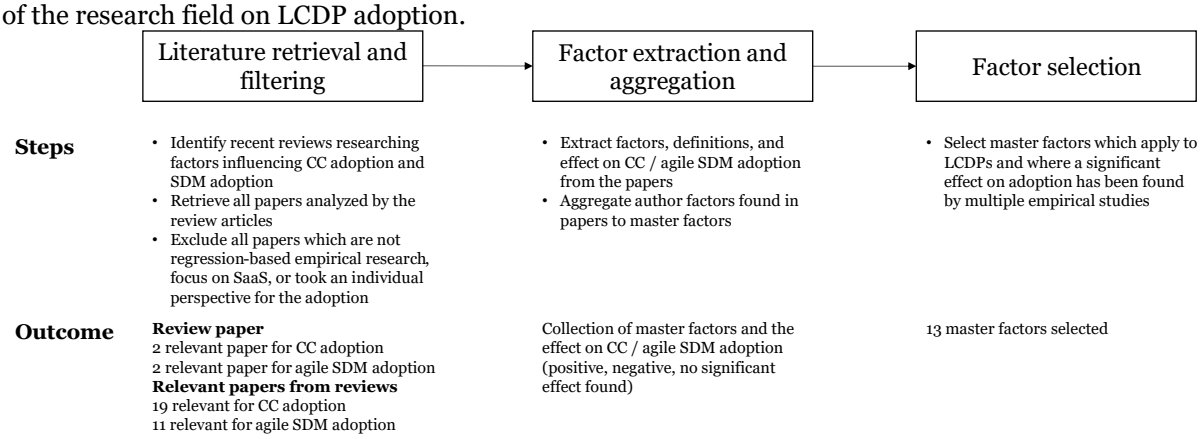

Figure 1: Outline of methodological process

In the first step, I searched only for review papers that provide a consolidated overview of the material that has already been published (Palmatier et al. 2018)(i.e., factors for CC and agile SDM adoption) and already structured the findings from previous research. For CC adoption, I searched for the keywords "cloud" and "computing" in conjunction with "adoption". I restricted the search to completed research papers written in English from highly ranked IS journals (litbaskets.io size "L" (Boell and Wang 2019)). This led to a total of 202 research papers. I reviewed the titles and abstracts of the 202 research papers and only included review papers focusing on factors for CC adoption for further analysis. With this approach, I ended with two papers summarising previous findings on factors influencing CC adoption (i.e., Schneider and Sunyaev 2016; Wulf et al. 2021).

For agile SDM adoption, I searched for the keywords "agile methodologies" OR "agile software development" in conjunction with any combination of "adoption" and "acceptance". I restricted the search to completed research papers written in English from highly ranked IS journals (litbaskets.io size "L" (Boell and Wang 2019)). This led to a total of 53 research papers. To get the final set of review papers that analyse factors for agile SDM adoption, I scanned the title and abstract and only included review papers that research factors for agile SDM adoption. With this approach, I ended with two papers summarising factors for agile SDM adoption (i.e., Chan and Thong 2009; Dybå and Dingsøyr 2008).

I retrieved all papers that were analysed by the four review papers. This led to 62 papers on CC adoption and 29 on agile SDM adoption. To ensure that the retrieved papers' findings are comparable, I excluded all papers that followed other research approaches than regression-based empirical research. Moreover,

as this research project applies a work system perspective, I excluded all papers that analyse adoption on an individual level. Further, I excluded CC adoption papers focused on SaaS cloud adoption because LCDPs are usually provided as PaaS (Rymer 2017). This led to a final set of 19 papers for CC adoption and 11 papers for agile SDM adoption.

In the next step, I extracted and aggregated the factors using the method developed by Jeyarj et al. (2006). First, I extracted the factors with the author's definition and the found effect (positive, negative, no significant effect found) from the papers. Second, I aggregated the author's factors to master factors to account for different wording. For this aggregation procedure, I iteratively went through the author's definitions and mapped the author's factors to master factors. If a new master factor was added, I re-examined all already coded factors to determine whether any refinement is required based on the new master factor. This aggregation to master factors has already been applied by Schneider and Sunyaev (2016) and Wulf et al. (2021). An example of an aggregated master factor is *security and data privacy concerns*, which comprises the author's factors of security concerns, concerns security, and concerns privacy.

In the final step, I selected the research model's factors from the list of master factors. I only included master factors if they were found to be significant by multiple empirical studies and applied to LCDPs (e.g., switching CAPEX with OPEX does not apply for LCDPs).

2 Definition of master factors

Factor	Definition
Security and data privacy concerns	Security concerns associated with virtualised and shared resources and the data transfer over the internet, as well as concerns about the disclosure of data by the provider (Schneider and Sunyaev 2016).
Compatibility	Compatibility is the degree to which an innovation fits into an organisation's values, experience, and needs (Rogers 2010).
Vendor lock-in	The vendor lock-in "[...] is the situation where customers are dependent (i.e., locked-in) on a single [...] provider technology implementation and cannot easily move in the future to a different vendor without substantial costs, legal constraints, or technical incompatibilities" (Opara-Martins et al. 2016, p. 2).
Expected efficiency improvements	Expected efficiency improvements are the expected reduction of required resources, costs, time to market, or overall business performance improvements when adopting an LCDP.
Complexity	Complexity is the degree to which an innovation is perceived as relatively complex to use (Rogers 2010).
Previous experience	"The degree to which an innovation may be tried out before its adoption, or experience from pilot applications" (Wulf et al. 2021, p. 584) as well as the prior technical knowledge an organisation possesses (e.g., on new software development methods) (Chan and Thong 2009).
Training opportunities	Training opportunities are the formal procedure of an organisation to facilitate learning (Chan and Thong 2009) and are done by LCDP vendors or external consultants.
Organisational culture	Organisational culture is defined as "a pattern of basic assumptions invented, discovered or developed by a given group as it learns to cope with its problems of external adaptation and integration that has worked well enough to be considered valid and, therefore, is to be taught to new members as the correct way to perceive, think, and feel in relation to those problems" (Schein 1990, p. 111).
Usefulness	Usefulness is the degree to which adopting a LCDP would be useful in performing application development (Hardgrave and Johnson 2003) (e.g., through higher flexibility, higher customisation of off-the-shelf applications).
Expected working mode improvement	LCDPs foster the empowerment of citizen developers and create a shared understanding between business and IT, facilitating teamwork in cross-functional settings and hence reducing inconsistent and unstable requirements (Käss et al. 2022), leading to a working mode improvement.
Top management support	"The degree to which an innovation is supported by top management" (Schneider and Sunyaev 2016, p. 30)
Internal IT capabilities	"The pool of resources, technical ability, expertise, knowledge, and skills available within the organisation and their efficiency in developing, implementing, managing, and maintaining the organisation's IT infrastructure and applications" (Schneider and Sunyaev 2016, p. 30)
External pressure	External pressure refers to an organisation's pressure from industry competitors, industry trends, trading partners, and the regulatory environment (Oliveira et al. 2014).

Table 1: Definition of master factors

3 Master factor's effect

Master factor	Effect found in previous adoption research	CC references	Agile SDM references
Security and data privacy concerns	Positive	Kinuthai (2015)	Sultan and Chan (2000)
	Negative	Siepermann et al. (2016), Hsu and Lin (2016), Al-Isma 'ili et al. (2016)	Factor not studied in relevant literature
Compatibility	Positive	Al-Isma 'ili et al. (2016), Loukis et al. (2017), Al- Shura et al. (2018)	Hardgrave et al. (2003), Riemenschneider et al. (2002)
Vendor lock-in	Negative	Siepermann et al. (2016)	Factor not found in analysed literature
Expected efficiency improvements	Positive	Loukis et al. (2017), Ming et al. (2018), Al-Isma 'ili et al. (2016), Siepermann et al. (2016), Hsu and Lin (2016)	Khalifa and Verner (2000)
Complexity	Negative	Al- Shura et al. (2018), Gutierrez et al. (2014)	Johnson (1999), Hardgrave et al. (2003)
Previous experience	Positive	Hsu and Lin (2016), Loukis et al. (2017)	Sultan and Chan (2000)
Training opportunities	Positive	Factor not studied in relevant literature	Rai and Patnayakuni (1996), Roberts et al. (1998)
Organisational culture	Positive	Velázquez and Ho (2015)	Higgins and Hogan (1999), Iivari and Huisman (2007), Khalifa and Verner (2000)
Usefulness	Positive	Loske et al. (2014)	Khalifa and Verner (2000)
Expected working mode improvement	Positive	Al- Shura et al. (2018), Al-Isma 'ili et al. (2016), Siepermann et al. (2016)	Sultan and Chan (2000), Khalifa and Verner (2000)
	Negative	Senyo et al. (2016)	Factor not found in analysed literature
Top management support	Positive	Senyo et al. (2016), Ming et al. (2018)	Roberts et al. (1998), Iivari and Huisman (2007), Higgins and Hogan (1999)
Internal IT capabilities	Positive	Gutierrez et al. (2014), Loukis et al. (2017), Ming et al. (2018)	Factor not found in analysed literature
External pressure	Positive	Al- Shura et al. (2018), Gutierrez et al. (2014), Hsu and Lin (2016)	Nelson and Rottman (1996), Sultan and Chan (2000)
	Negative	Senyo et al. (2016)	Factor not found in analysed literature

Table 2: Effect of master factors found in previous research

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