

CRM INFLUENCE ON ORGANISATIONAL PERFORMANCE — THE MODERATING ROLE OF IT RELIABILITY

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ABSTRACT

Purpose. This article mainly aims to verify the role of IT reliability as the factor potentially strengthening the CRM influence on organisational performance and conclude whether the IT reliability is indeed an important factor shaping the CRM ability to generate value for an organisation. Methodology. The empirical research was conducted to verify the existence of such a relation. The research was carried out based on the survey performed among organisations, and the sample included 558 entities from Poland and 564 from Switzerland. The statistical analysis of the obtained results was carried out using regression analysis with the moderator. Results. The obtained models clearly show that IT reliability is a moderator of the relation between CRM time-of-use and the organisational performance. The theoretical contribution. The obtained results clearly confirm that the existing IT solutions should support CRM, and with such support, this management method is positively influencing the organisational performance. Such a conclusion seems to be an important contribution to the studied field of research, filling the research gap concerning the mechanism of IT support for CRM. It remains consistent with the views from the literature and contributes to their extension.

KEY WORDS

management, Customer Relationship Management, IT in an organisation, IT reliability, organisational performance

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INTRODUCTION

Conditions of the contemporary market economy, i.e. the high variability of an organisation's environment, the progressing globalisation in the trade field as well as the intensification of competition require organisations to create strong and long-term consumer relations (Tsou and Huang, 2018; Dubey and Sangle, 2019; Santouridis and Tsachtani, 2015). It seems that

the best response to this challenge is the concept of Customer Relationship Management (CRM), which began in the 1990s (Ngai, 2005) and became an important tool in the area of marketing management in the last two decades (Waseem, 2019). Within those frames, organisations transferred their interest from products or services to the customer, i.e. the centric approach (Santouridis and Tsachtani, 2015).

Usually, CRM is perceived as a combination of people, processes and technology that seeks to understand a company's customers (Chen and Popovich, 2003; Dwiastuti et al., 2018) in general and has a special emphasis on key customers (Akroush et al., 2011). It can be analysed from two perspectives: strategic and technological (Santouridis and Tsachtani, 2015). The literature suggests approaches focused either on the consumer and the strategic relationship management (Light, 2001) or on the technology (Peppard, 2000). Nowadays, it seems that those aspects should be perceived together as a complex combination of business and technological factors building the CRM as management methods used in an organisation in a broader sense of organisational strategy (Keramati et al., 2010; Bull, 2003; Chen and Popovich, 2003).

There is no doubt that properly implemented CRM might bring a lot of benefits both from the point of view of the client and the organisation, such as customer acquisition, customer retention, financial benefits, customer loyalty, cross-selling, customer profitability, value creation for the customer, customisation of products and services (Sivaraks et al., 2011; Kim and Kim, 2009; Richards and Jones, 2008; Kim et al., 2003). However, despite its popularity, the CRM concept has been repeatedly criticised for unsatisfactory results that organisations achieve (Richards and Jones, 2008; Bull, 2003). Therefore, it seems reasonable to research the effects of the CRM on organisational performance, using a new approach that considers the role of IT reliability.

However, it seems that a solid relationship exists between the implementation of the CRM management method and the use of IT solutions supporting this method. Clearly, the ability of CRM to influence the organisational performance should not be perceived as only related to the implementation of IT solution support as this approach seems inadequate (Chen and Popovich, 2003). IT solutions may be very useful in the support and integration of processes that provide customer satisfaction (Ngai, 2005; Ryals and Payne, 2001), with a broader view on organisation (Akroush et al., 2011). However, the outcome seems only possible if the IT solutions used for CRM support are reliable. Therefore, this article mainly focuses on verifying the role of IT reliability as the factor potentially strengthening the CRM influence on the organisational performance. The theoretical background is presented in the first part of the article. The second part continues the topic and connects it to the development of hypotheses, further describing

research methods. The third part presents results of the empirical research, conducted to verify the existence of the assumed relation. Finally, the conclusions confirm that IT reliability is indeed an important factor shaping the ability of CRM to generate value for an organisation.

1. LITERATURE REVIEW

1.1. ROLE OF IT IN SUPPORTING MODERN MANAGEMENT METHODS — IT RELIABILITY

Various management methods differ depending on their need for IT support in the phase of implementation and operation in an organisation (Rosemann and Brocke, 2015; Al-Mashari et al., 2003; Ngai et al., 2009; Wan, 2009; Lira et al., 2012; Tworek, 2019). Different management methods demonstrate different sensitivity to IT support and a different level of standardisation and alignment of existing IT solutions available for every organisation to choose from and implement. Moreover, it is crucial to underline that with changes in the internal and external conditions of the organisation's functioning (changes in size or configuration of the organisation, information technology development, emergence of new markets etc.), existing IT aimed at supporting various management methods must be improved and transformed to ensure the continued alignment between IT solutions and current needs, otherwise they will lose the ability to perform the functions for which they were created, and the organisation will cease to benefit from the implementation of those management methods (Tworek, 2019).

Since the relevance and the need for the use of IT in an organisation seems to finally be indisputable, there is a need for the analysis and evaluation of its use in organisations. The concept of 3R (reliability, resilience and robustness) emerged in the literature a few years ago (Little, 2003). It underlines that the key factor influencing the ability to profit from the use of IT is its appropriate functioning in the organisation (Tworek, 2018a).

The reliability of IT in an organisation is understood as a measurable property of IT, useful for its control and management, identifying its quality level and indicating potential problems (Zahedi, 1987). It is directly linked to the efficiency of IT components, especially those critical to its proper operations. The reliability of IT in an organisation is a notion built by factors connected to 3 different IT theories: the suc-

cess model by DeLone and McLean (2003), four types of IS failure by Lyytinen (1987), and the TAM model by Davis (1985). Based on that, the model of IT reliability in an organisation has been developed by Tworek (2016, 2018a) and verified in various business contexts (Tworek 2018a, 2018b, 2019). It consists of three factors: the reliability of the information included in IT in the organisation, the reliability of support services offered for IS in the organisation, and the reliability of the system itself (including the usability of the system). Each factor consists of a series of items, listed in Fig. 1.

Bieńkowska et al. (2018) performed a preliminary study concerning the influence of IT reliability (measured using an IT reliability framework) on results of controlling, and Tworek and Zabłocka-Kluczka (2018) did the same for Business Continuity Management. Both cases revealed the existence of

a strong possibility that IT reliability could have a significant influence on other management methods as well and simultaneously verified the use of the IT reliability framework for this type of analysis of IT solutions in an organisation.

Requirements of CRM implementation and operation in an organisation evolve in time. Also, they require changes in the area of IT solutions that support CRM. IT reliability might be perceived by the users of the CRM system (employees of the organisation). The perception of IT reliability by the user may be subjective due to individual experience with the system and the degree of matching the system to the tasks to be supported (Bieńkowska et al., 2019). Despite this subjectivity, it can be assumed that the long-term use of the CRM system can have a positive relationship with IT reliability as, over time, the CRM concept evolves to meet the needs of a specific organ-

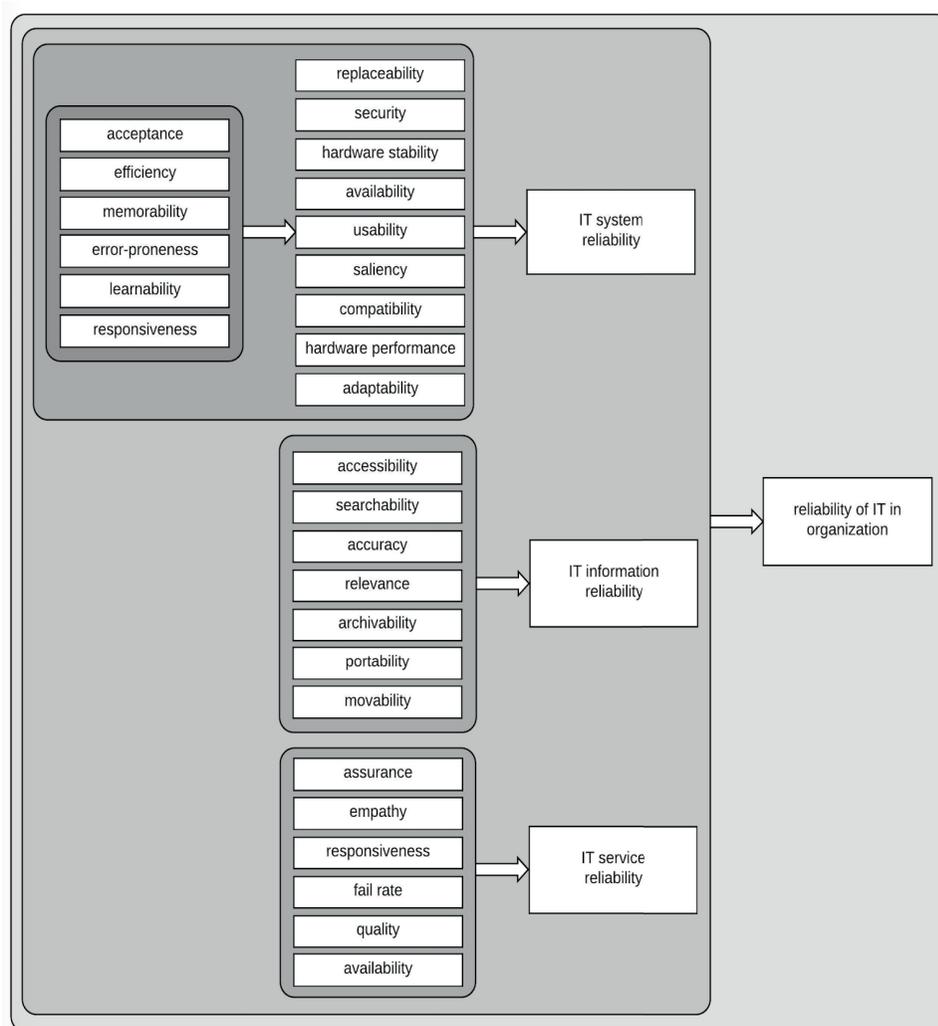


Fig. 1. Verified IT reliability model

Source: (Tworek, 2019).

isation. The detailed theoretical considerations concerning this subject aimed at hypothesis development are presented next.

2. RESEARCH METHODOLOGY

2.1. CRM AND IT RELIABILITY — THE DEVELOPMENT OF HYPOTHESES

Without a doubt, IT solutions existing in the organisation should be aimed at supporting CRM, and without them, it is impossible to efficiently use this management method (Ngai et al., 2009; Payne and Frow, 2005). This notation CRM is also commonly used in IT development to describe IT solutions dedicated to the support of this method (Payne and Frow, 2005). Hence, there are standardised and well-known IT solutions aligned with the needs of CRM available for every organisation to make a choice. However, each organisation is different, and employee requirements in the case of IT solution support for their activities concerning CRM also differ. Therefore, in time, the IT solutions should become more and more aligned with those requirements due to continuous changes and improvements implemented to facilitate specific requirements of an organisation. As stated by Tworek (2019), alignment is directly linked to IT reliability. The more aligned are the solutions with actual needs, the higher is the IT reliability (which may be considered an indicator of the alignment maturity). Therefore, it seems that IT reliability might be correlated with CRM time-of-use. A higher IT reliability, indicating a higher alignment (which can be obtained only in time), should cooccur with a longer period of the CRM use. Based on that reasoning, the following hypothesis was formulated: H1: There is a positive relationship between IT reliability (and all of its components) and the CRM-time of-use.

Existing studies concerning CRM and organisational performance capture various issues, but the results are not conclusive (Keramati et al., 2010). For instance, the studies by Soltani et al. (2018) indicate a positive correlation between the success of CRM and organisational performance, indicating factors that impact on the success of CRM: customer orientation, organisation's capability, information technology, and customer knowledge management. In turn, studies by Josiassen et al. (2014) showed that CRM affects organisational performance but not in

all dimensions. However, Bull's (2003) research showed that only in the case of 30 percent of organisations that implemented the CRM concept, it had a positive impact on their organisational performance (Bull, 2003). These inconsistencies indicate the necessity to indicate factors that can affect organisational performance (Chang et al., 2010). Therefore, considering the previously discussed aspects, it seems important to examine the relationship between the CRM time-of-use and the organisational performance in the light of IT reliability as factors potentially enabling and strengthening this relationship. IT reliability may assume the role of a moderator between the CRM time-of-use and the organisational performance. That is mainly because the alignment between business requirements (and employee requirements in the case of IT solution support) has an indirect influence on the organisational performance through the positive impact on the quality of any management method, which is highly sensitive for IT solution support (Tworek, 2019). CRM is definitely a highly sensitive method. Therefore, it seems that the alignment obtained in time (with the increase in the CRM time-of-use) may be a source of strengthening the influence of the CRM time-of-use on the organisational performance due to the increase of the CRM quality (and its more efficient use in the organisation due to greater IT reliability). Moreover, according to Park and Kim (2003), the role of information reliability seems to be of particular importance. They linked CRM with information strategy of the organisation, stating that there are three types of information: generated of-the-customer, for-the-customer, and by-the-customer. The reliability of all these types is not only a prerequisite for the efficient use of CRM but also seems to be an enabler for generating the value for the organisation from using this management method and translating it into improved organisational performance. This view is also supported by other researchers, e.g., Liao et al. (2010) underlining the role of information trust, or Liu et al. (2006) expressing the need for information quality boost for CRM. Therefore, the additional hypothesis should be formulated: H2: CRM time-of-use has a positive influence on organisational performance.

And, what's more important: H2a: The higher IT reliability, the stronger the influence of the CRM time-of-use on organisational performance.

In light of the above, the following research hypotheses can be formulated (Fig. 2).

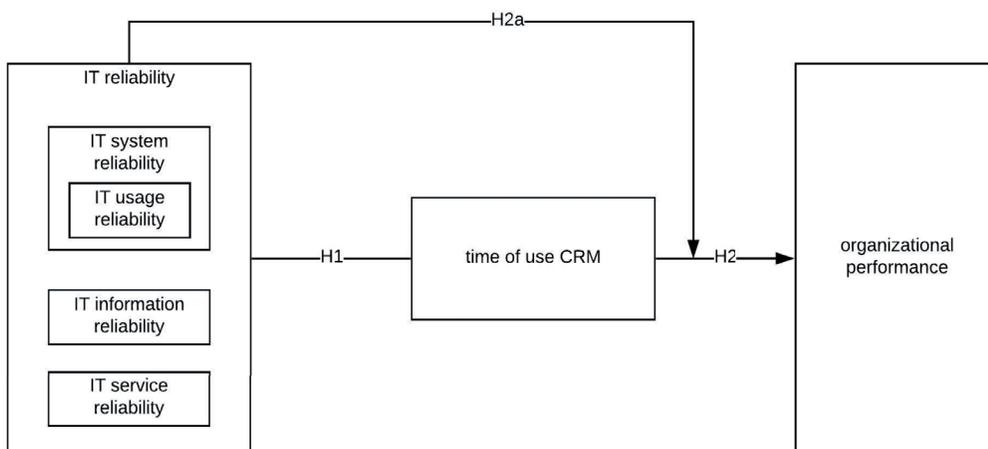


Fig. 2. Developed hypotheses

2.2. RESEARCH METHOD AND SAMPLE

The survey was conducted to verify the proposed hypotheses and identify the level of IT reliability, the CRM time-of-use and organisational performance in two business contexts. The main survey was preceded by the pilot survey conducted in early 2018 in a group of 50 organisations to explain the issues concerning the ambiguity of several questions. According to obtained results, the ambiguous questions were rewritten to obtain more informed responses from organisations participating in the main survey. The main research was conducted as a part of the research project “The IT reliability influence on the quality of management methods and techniques” No. 2017/01/X/HS4/01967 funded by the National Science Centre in Poland. The main survey was conducted in March 2018, with organisations located in Poland and Switzerland, which was the only condition limiting the sample (organisations were surveyed regardless of their size, industry or a type of business etc.), using online survey service: SurveyMonkey. Only one survey was carried out anonymously in one organisation, and it was completed by employees who had a broad view of the entire organisation.

The research sample contains organisations operating in Poland and Switzerland. 558 valid responses were collected from Poland, and 564 valid responses were collected from Switzerland. The sample cannot be considered representative since the population of organisations operating in those two countries was finite but very large, and the method of including an organisation in the sample did not support its representativeness. However, it is sufficiently diversified to be a basis for overall conclusions concerning the topic. Sample characteristics are presented in Tab. 1; the sample covers organisations of all sizes and types.

2.3. MEASUREMENT OF VARIABLES

To examine the proposed hypotheses, key variables were defined: IT reliability, the CRM time-of-use and organisational performance. Respondents evaluated all variables basing on the list of factors and using the Likert scale (for IT reliability, the scale from “very poor” to “very good” with the middle point “fair”; for other variables, the scale from “I strongly agree” to “I strongly disagree” with the middle point “I do not have an opinion”).

Tab. 1. Research sample characteristics

ORGANISATION'S SIZE	MANUFACTURING ORGANISATIONS	SERVICE ORGANISATIONS	TRADE ORGANISATIONS	TOTAL
Micro (below 10 people)	130	64	27	221
Small (11-50 people)	87	144	43	274
Medium (51-250 people)	63	112	73	248
Large (above 250 people)	120	184	75	379
Total	400	504	218	1122

IT reliability was measured considering all IT solutions used in the organisation (IT solutions for CRM were one of those) using the Likert scale, which seems to be an appropriate choice (for IT reliability, the scale from “very poor” to “very good” with the middle point “fair”; for other variables, the scale from “I strongly agree” to “I strongly disagree” with the middle point “I do not have an opinion”). First of all, the reliability of IT in an organisation is a subjective notion. Employees’ perspective and opinion concerning the aspects of IT reliability are the best sources of knowledge since their perception matters the most. IT influences the organisation mainly through its potential to influence every-day work of the employees. Quantitative methods are commonly used to assess the software and hardware features linked to reliability. However, they do not give information concerning the actual perception of this notion within the organisation (Tworek, 2018). Based on that assessment, one key variable was defined: IT reliability (consisting of the reliability of the IT system, the reliability of the IT information, and the reliability of the IT service).

The CRM time-of-use in an organisation was based on a single question. Respondents were asked to indicate the time taken by controlling that operates in the organisation in the specified intervals (“not used”, “recently implemented”, “used for more than a year”, “used for more than 5 years”, “used for more than 10 years”).

The organisational performance was measured on a 4-item scale, including the return on investment (ROI), the sales growth, the profit growth and productivity improvement (Maletic et al., 2015). The evolution of the performance during the previous three years was conducted. In line with literature, subjective measures of organisational performance were used (Bansal 2005; Maletic et al., 2015). On the one hand, the objective performance measures (such as financial) are difficult to obtain due to confidentiality or unavailability. On the other, a subjective examination, although always exposed to errors, facilitates the comparison of many different organisations due to the studied aspects. Finally, there is evidence that subjective and objective performance

measures are strongly correlated (Dawes, 1999; Dess and Robinson, 1984). Due to different industries, sizes and strategic priorities of investigated organisations, performance data needed to be adjusted to evaluate each organisation. For this purpose, respondents were asked to answer the questions by comparison to expectations. The organisational performance was rated on the Likert scale (from “well below expectations” to “well above expectations” with the middle point “as expected”).

3. RESEARCH RESULTS

3.1. DESCRIPTIVE STATISTICS AND THE RELIABILITY ANALYSIS OF SCALES

As the first step in the research process, the reliability of scales of each variable was verified. The results received from the analysis of the reliability of the measurement scales are presented in Tab. 2. It is worth underlining that Cronbach’s α was high for every variable, which indicates a high internal reliability of the scales and measurements.

3.2. RELATIONSHIPS BETWEEN IT RELIABILITY, THE CRM TIME-OF-USE AND ORGANISATIONAL PERFORMANCE

To verify hypotheses H1 and H2, the correlation between IT reliability, the CRM time-of-use and organisational performance was calculated as the first part of the study. The correlation between IT reliability and the CRM time-of-use was analysed with the help of Pearson’s correlation to verify the hypothesis H1. The results are presented in Tab. 3. The results showed that IT reliability was statistically significantly correlated with the CRM times-of-use. Moreover, the value of the Pearson’s coefficient was much higher in the case of IT system reliability ($r = 0.406$) suggesting that it was the most important component of IT reliability from the point of view of CRM. Therefore, the hypothesis H1 could be accepted: as there was a significant relationship between the CRM time-of-use and IT reliability.

Tab. 2. Defined variables together with the results of the reliability analysis of scales

NO.	VARIABLE	NO. OF SCALES	CRONBACH’S α
1	IT reliability	28	0.953
2	CRM time-of-use	1	--
3	Organisational performance	4	0.911

The correlation between the CRM time-of-use and the organisational performance was analysed with the use of Pearson’s correlation to verify the hypothesis H2 and is presented in Tab. 4.

The results showed that the CRM time-of-use was statistically significantly correlated with organisational performance, which was not enough to accept the H2 hypothesis because the correlation analysis did not verify the cause–effect relationship. However, it was enough for an initial verification allowing to use it to build a regression model to fully confirm the H2 hypothesis and verify further hypotheses formulated above.

To do that and to verify the hypothesis H2a, the regression analysis with the moderator was performed.

3.3. IT RELIABILITY AS A MODERATOR FOR THE RELATIONSHIPS BETWEEN THE CRM TIME-OF-USE, AND ORGANISATIONAL PERFORMANCE

The relationship between the CRM time-of-use and organisational performance (hypothesis H2 and H2a) was analysed in the context of IT reliability to verify the statistical significance of this notion as a moderator of the given relationship. Regression analysis with a moderator was used for IT reliability as a general concept and for each of its three components separately. Statistical reasoning was based on the same procedure in all cases. In every case, as the first step, a new variable — moderator — was introduced. The moderator variable was built as a product of two standardised independent variables (the CRM time-of-use as a first independent variable and IT reliability as a second independent variable). As the second step, three regression models were built for every case (the analysis was performed using the Process macro for IBM SPSS Statistics). The first model was built as a base model for comparison, only independent variables (IT reliability as a second independent variable) were added as predictors. The second model was built using independent variables

(IT reliability still as a second independent variable) together with the moderator as predictors to verify whether the moderating influence was occurring in the entire sample. To confirm that, the third regression model was built using only one independent variable (without IT reliability as a second independent variable) and the moderator as predictors. The results of the analysis are presented in Tab. 5.

The obtained models clearly showed that IT reliability was a moderator of the relationship between the CRM time-of-use and organisational performance (hypothesis H2a). The delta R2 and obtained model for IT reliability (the whole concept) as a moderator were statistically significant (F (1, 1016) = 270.589, p < 0.001). In the case of detailed models verifying the moderating role of three components of IT reliability, the results were not unambiguous. All of them were statistically significant (IT system reliability (F (1, 1077) = 289.248, p < 0.001), information reliability (F (1, 1086) = 284.044, p < 0.001) and service reliability (F (1, 1090) = 251.208, p < 0.001)). However, as shown in Tab. 5, the moderating role was positively verified only in the case of system reliability and information reliability. Therefore, the obtained results were the basis for positive verification of the hypotheses H2a. The hypothesis could be accepted stating that the higher was IT reliability, the stronger was the influence of the CRM time-of-use on organisational performance. Moreover, the first obtained models confirmed the cause–effect relationship between the CRM time-of-use and organisational performance (since R2 = 0.66 and CRM time-of-use was a statistically significant variable in the models) and allowed for the final acceptance of the H2 hypothesis stating that the CRM time-of-use had a positive influence on organisational performance.

CONCLUSIONS

The obtained results clearly confirm that the existing IT solutions should support CRM, and with

Tab. 3. Correlation analysis between IT reliability and the CRM time-of-use

CORRELATION	IT RELIABILITY	IT SYSTEM RELIABILITY	IT INFORMATION RELIABILITY	IT SERVICE RELIABILITY
CRM time-of-use	r(1036)=0.408**, p<0.001	r(1102)= 0.406**, p<0.001	r(1111)= 0.367**, p<0.01	r(1115)= 0.394**, p<0.01

Tab. 4. Correlation between the CRM time-of-use and the organisational performance

	ORGANISATIONAL PERFORMANCE
CRM time-of-use	r(1117)=0.529**, p<0.001

Tab. 5. Research sample characteristics

MODEL DESCRIPTION	R ²	DELTA R ²	MODERATOR COEF.	STANDARD ERROR	T STAT	P VALUE
CRM time-of-use, IT reliability, Moderator <i>dependent v.: performance</i>	0.666	0.039	0.483	0.018	2.661	0.007
CRM time-of-use, IT system reliability, Moderator <i>dependent v.: performance</i>	0.668	0.040	0.474	0.016	2,801	0.005
CRM time-of-use, IT information reliability, Moderator <i>dependent v.: performance</i>	0.637	0.054	0.539	0.017	3.135	0.002
CRM time-of-use, IT service reliability, Moderator <i>dependent v.: performance</i>	0.639	0.001	0.299	0.016	1,818	0.069

such support, this management method positively influences organisational performance. Such a conclusion seems to be an important contribution to the studied field of research, filling the research gap concerning the mechanism of IT support for CRM. It remains consistent with the views from the literature (e.g. Ngai et al., 2009; Payne and Frow, 2005) and contributes to their extension. First of all, the correlation analysis confirms a strong positive relationship between the CRM time-of-use and organisational performance, confirming the method's rising ability to positively influence organisation's operations. Secondly, the regression analysis showed that IT reliability (and all of its components) were significant moderators of the relationship between the CRM time-of-use and organisational performance, confirming that IT support can strengthen that influence. The strongest moderating effect occurred in the case of IT information reliability. It seems to confirm views presented in the literature stating that information reliability is of particular importance in the case of supporting CRM using IT solutions (e.g. by Park and Kim, 2006; Liao et al., 2010; Liu et al., 2006). The least significant moderating effect occurred in the case of service reliability, which, in turn, was consistent with the view that CRM — as a method highly sensitive for IT solution support — is used by employees highly skilled in performing their tasks with the use of IT (Tworek, 2019). That is why the role of support service reliability is smaller than the role of the reliability of the system itself and its use, which more directly affect the tasks performed by a skilled user.

Therefore, it seems that the obtained results confirm that the alignment obtained in time (with the increase of the CRM time-of-use) may be a source for strengthening the influence of the CRM time-of-use on organisational performance due to the increase of the CRM quality. Moreover, its more efficient use in an organisation is influenced by IT reliability (especially, the reliability of information used in the IT solution), which is proven to be a moderator of this relationship.

In the modern economy, it is impossible to operate as a successful organisation without IT existence. It is equally common knowledge that IT might be the factor that supports management methods. Within these frames, the main aim of this article was achieved due to successful verification of the role of IT reliability as the factor strengthening the influence of CRM on organisational performance. The obtained results clearly showed that there was a positive, statistically significant correlation between IT reliability (and all of its components) and the CRM time-of-use. Moreover, they showed that IT reliability was a moderator of the relationship between the CRM time-of-use and organisational performance.

However, the performed empirical study is burdened with certain limitations. The hypotheses were tested based on one research sample, limited to organisations operating in Poland and Switzerland. Moreover, CRM was analysed as one of many existing management methods, and IT solution support was not considered separately for each of them. However, it seems to be a solid first step underlining the need

for further analysis of the subject, considering not only the time of use of CRM but also its maturity.

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LITERATURE

- Akroush, M. N., Dahiyat, J. S. E., Gharaibeh, J. H. S., & Abu-Lail AL-Hilal, B.N. (2011). Customer relationship management implementation: An investigation of a scale's generalizability and its relationship with business performance in a developing country context. *International Journal of Commerce and Management*, 21(2), 158-191.
- Al-Mashari, M., Al-Mudimigh, A., & Zairi, M. (2003). Enterprise resource planning: A taxonomy of critical factors. *European Journal of Operational Research*, 146(2), 352-364.
- Bansal, P. (2005). Evolving sustainably: A longitudinal study of corporate sustainable development. *Strategic Management Journal*, 26(3), 197-218.
- Bieńkowska, A., Tworek, K., & Zabłocka-Kluczka, A. (2019). Information technology reliability influence on controlling excellence. *The International Journal of Digital Accounting Research*, 19, 1-28.
- Bull, C. (2003). Strategic issues in customer relationship management (CRM) implementation. *Business Process Management Journal*, 9(5), 592-602.
- Chang, W., Park, J. E., & Chaui, S. (2010). How does CRM technology transform into organizational performance? A mediating role of marketing capability. *Journal of Business Research*, 63, 849-855.
- Chen, I., & Popovich, K. (2003). Understanding customer relationship management (CRM): People, process and technology. *Business Process Management Journal*, 9(5), 672-688.
- Davis, F. D. (1985). *A technology acceptance model for empirically testing new end-user information systems: Theory and results*. Doctoral dissertation, MIT USA.
- Dawes, J. (1999). The relationship between subjective and objective company performance measures in market orientation research: further empirical evidence. *Marketing Bulletin-Department of Marketing Massey University*, 10, 65-75.
- Delone, W. H., & McLean, E. R. (2003). The DeLone and McLean model of information systems success: a ten-year update. *Journal of Management Information Systems*, 19(4), 9-30.
- Dess, G. G., & Robinson Jr, R. B. (1984). Measuring organizational performance in the absence of objective measures: the case of the privately held firm and conglomerate business unit. *Strategic Management Journal*, 5(3), 265-273.
- Dubey, N. K., & Sangle, P. (2019). Customer perception of CRM implementation in banking context Scale development and validation. *Journal of Advances in Management Research*, 16(1), 38-63.
- Dwiastuti, A., Larasati, A., & Prahastuti, E. (2018). *The implementation of Customer Relationship Management (CRM) on textile supply chain using k-means clustering in data mining*. International Mechanical and Industrial Engineering Conference 2018.
- Josiassen A., Assaf A. G., & Cvelbar, L. K. (2014). CRM and the bottom line: Do all CRM dimensions affect firm performance? *International Journal of Hospitality Management*, 36, 130-136.
- Keramati, A., Mehrabi, H., & Mojir, N. (2010). A process-oriented perspective on customer relationship management and organizational performance: An empirical investigation. *Industrial Marketing Management* 39(7), 1170-1185.
- Kim, H. S., & Kim, Y. G. (2009). A CRM performance measurement framework: Its development process and application. *Industrial Marketing Management*, 38(4), 477-489.
- Kim, J., Suh, E., & Hwang, H. (2003). A model for evaluating the effectiveness of CRM using the balanced scorecard. *Journal of Interactive Marketing*, 17(2), 5-1.
- Liao, S. H., Chen, Y. J., & Deng, M. Y. (2010). Mining customer knowledge for tourism new product development and customer relationship management. *Expert Systems with Applications*, 37(6), 4212-4223.
- Light, B. (2001). *A review of the issues associated with customer relationship management systems*. Proceedings of the 9th European Conference on Information Systems, 1232-1241.
- Lira A. M. D., Parisi, C., Peleias, I. R., & Peters, M. R. S. (2012). Uses of ERP systems and their influence on controllership functions in Brazilian Companies. *JISTEM-Journal of Information Systems and Technology Management*, 9(2), 323-352.
- Little, R. G. (2003). *Toward more robust infrastructure: observations on improving the resilience and reliability of critical systems*. System Sciences. Proceedings of the 36th Annual Hawaii International Conference, IEEE.
- Liu, Y., Zhou, C. F., & Chen, Y. W. (2006). Determinants of E-CRM in influencing customer satisfaction. In: *Pacific Rim International Conference on Artificial Intelligence* (pp. 767-776). Berlin, Heidelberg: Springer.
- Lyytinen, K. (1987). Different perspectives on information systems: problems and solutions. *ACM Computing Surveys (CSUR)*, 19(1), 5-46.
- Maletic, M., Maletic, D., Dahlgaard, J., Dahlgaard-Park, S. M., & Gomišček, B. (2015). Do corporate sustainability practices enhance organizational economic performance? *International Journal of Quality and Service Sciences*, 7(2/3), 184-200.
- Ngai, E. W. T. (2005). Customer relationship management research (1992-2002): An academic literature review and classification. *Marketing Intelligence & Planning*, 23(6), 582-605.
- Ngai, E. W., Xiu, L., & Chau, D. C. (2009). Application of data mining techniques in customer relationship

- management: A literature review and classification. *Expert Systems with Applications*, 36(2), 2592-2602.
- Park, C. H., & Kim, Y. G. (2003). A framework of dynamic CRM: linking marketing with information strategy. *Business Process Management Journal*, 9(5), 652-671.
- Payne, A., & Frow, P. (2005). A strategic framework for customer relationship management. *Journal of Marketing*, 69(4), 167-176.
- Peppard, J. (2000). Customer relationship management (CRM) in financial services. *European Management Journal*, 18(3), 312-327.
- Richards, K. A., & Jones, E. (2008). Customer relationship management: finding value drivers. *Industrial Marketing Management*, 37(2), 120-130.
- Rosemann, M., & vom Brocke, J. (2015). The six core elements of business process management. In: *Handbook on business process management 1* (pp. 105-122). Berlin, Heidelberg: Springer.
- Ryals, L., & Payne, A. (2001). Customer relationship management in financial services: towards information-enabled relationship marketing. *Journal of Strategic Marketing*, 9(1), 3-27.
- Santouridis, I., & Tsachtani, E. (2015). Investigating the Impact of CRM Resources on CRM Processes: a Customer Life-Cycle Based Approach in the Case of a Greek Bank. *Procedia Economics and Finance*, 19, 304-313.
- Sivaraks, P., Krairit, D., & Tang, J. C. S. (2011). Effects of e-CRM on customer-bank relationship quality and outcomes: The case of Thailand. *Journal of High Technology Management Research*, 22, 141-157.
- Soltani, Z., Zareie, B., Milani, F. S., & Navimipour, N. J. (2018). The impact of the customer relationship management on the organization performance. *Journal of High Technology Management Research*, 29, 237-246.
- Tsou, H. T., & Huang, Y. W. (2018). Empirical Study of the Affecting Statistical Education on Customer Relationship Management and Customer Value in Hitech Industry. *Eurasia Journal of Mathematics, Science and Technology Education*, 14(4), 1287-1294.
- Tworek K. (2019). *Aligning IT with business: fostering organizational performance, employees' commitment and quality of management methods*, Cham, Great Britain: Springer.
- Tworek, K. (2016). Model niezawodności systemów informacyjnych w organizacji [Reliability model of information systems in organization]. *Zeszyty Naukowe. Organizacja i Zarządzanie/Politechnika Śląska*, 88, 335-342.
- Tworek, K. (2018a). *Information systems reliability in the context of higher education institutions. 10th annual International Conference on Education and New Learning Technologies*. Conference Proceedings, Palma de Mallorca (Spain), IATED Academy, 2-4 July.
- Tworek, K. (2018b). *Reliability of information systems in organization in the context of banking sector: empirical study from Poland*, COGENT Business and Management.
- Tworek, K., & Zabłocka-Kluczka, A. (2018). *IT reliability influence on organization benefits from business continuity management*. International Multidisciplinary Scientific Conference on Social Science SGEM.
- Wan, S. (2009). Service impact analysis using business continuity planning processes. *Campus-Wide Information Systems*, 26(1), 20-42.
- Waseem, J. (2019). Scale Development and Construct Validity of Organizational Capital in Customer Relationship Management Context: A Confirmatory Factor Analysis Approach. *Business Perspectives and Research*, 7(1), 76-91.
- Zahedi, F. (1987). Reliability of information systems based on the critical success factors-formulation. *Mis Quarterly*, 11(2), 187-203.