

HOW THE FIT BETWEEN ADAPTIVE ANALYTICS AND ORGANIC CULTURE IMPACTS ORGANIZATIONAL PERFORMANCE

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Acknowledgements:

The submitting author declares that the paper has not been presented at any of the previous EMAC Conferences and has not been published (electronically or in print) in any journal.

Cite as:

LOURO ALAMIR, BRANDAO MARCELO, Jaklič Jurij (2020), HOW THE FIT BETWEEN ADAPTIVE ANALYTICS AND ORGANIC CULTURE IMPACTS ORGANIZATIONAL PERFORMANCE. *Proceedings of the European Marketing Academy*, 49th, (62831)

Paper from the 49th Annual EMAC Conference, Budapest, May 26-29, 2020.



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Abstract

In marketing, there is interest in understanding how market knowledge is learned with the purpose to improve organizational performance and how analytics is changing this process. We tested how analytics boosts performance through intervening constructs (mediated role) to increase the explanation of the phenomenon. Thus, it is conjectured that analytics alone cannot improve performance. This work aims to narrow the marketing capabilities gap using a perspective for organizational culture and adaptive analytics. The model has two factors mediated for the fit antecedent construct better explaining the fit boosts organizational performance. The mechanism engenders the fit construct, measured as covariation, marketing capabilities, and absorptive capacity in European Union and Brazil. The hypothesis tests were developed by SEM and PROCESS. The work of fitted culture and analytics facilitated by a parallel mediation expands analytics role and interconnects the information systems and marketing literature.

Keywords: *Adaptive Analytics. Culture. Marketing Capabilities.*

Track: Marketing Strategy & Theory

1 Introduction

A massive number of recent empirical studies in marketing and information systems have used a myriad of capabilities constructs related to analytics. Variations include business analytics, business intelligence and analytics (BI&A), CRM analytics, social media analytics, big data analytics (Chuang & Lin, 2017; Côte-Real et al., 2017; Wamba et al., 2017) and customer analytics capabilities (Louro et al., 2019).

Different management disciplines hold that organizational culture is a type of social system within an organization that helps to explain strategic choices to obtain better performance (Schein, 1990). In updated marketing and management literature, there is interest in culture as the antecedent of organizational performance (Wu, 2016; Mandal, 2017).

Revolutionary technologies improved analytics power establishing adaptive analytics that can explore and exploit the market knowledge (Louro et al., 2019). However, there is a literature gap in measuring a construct that represents the fit between culture and the adaptive capabilities related to analytics. We proposed and tested a scale for adaptive analytics and organic cultural fit (FIT_AAOC). The next step is to answer: how does this variable influence organizational performance? We estimated that absorptive capacity and marketing capabilities better explain this relationship as both use market knowledge to improve performance.

Absorptive capacity enables market knowledge creation based on "prior related-knowledge, effective learning routines, and rich communication" (Liu, Ke, Wei, & Hua, 2013, p. 1454). Marketing capabilities integrate market knowledge throughout the organization to adapt other organizational resources/capabilities (Barrales-Molina et al., 2014, p.13). Assuming that FIT_AAOC is the best way to explore market knowledge, FIT_AAOC narrows the marketing capabilities gap (Day, 2011) through absorptive capacity and marketing capabilities.

The model was tested using Structured Equation Modeling (SEM) with Partial Least Square (PLS) and Ordinary Least Square (OLS) with SPSS PROCESS macro to expand the mediation test. This work presents a parallel mediation mechanism to show how some organizations have shorter marketing capabilities gap than others.

2. Theoretical Model and Hypothesis

The theoretical model is shown in Figure 1.

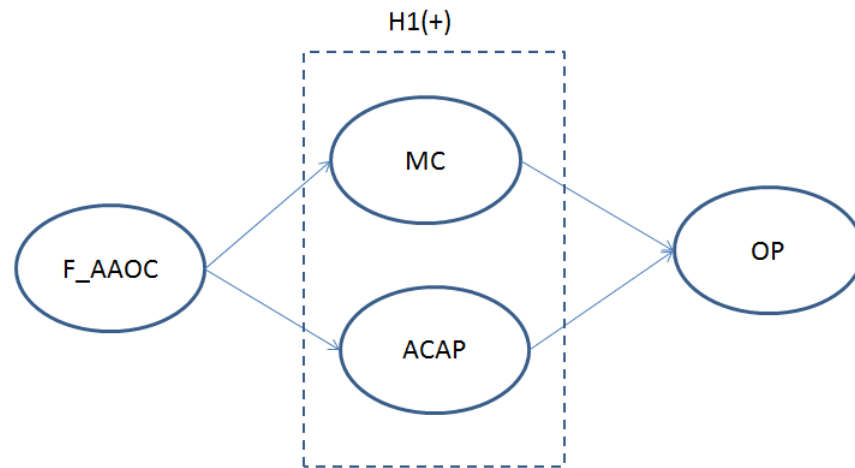


Figure 1. Theoretical Model

Source: Prepared by the authors (2020)

Information systems literature uses capabilities to explain the learning process (Teo et al., 2016; Wang & Byrd, 2017), but these approaches do not focus on the market knowledge learning process, and market knowledge is essential for changing / reconfiguring organizational strategies (Barrales-Molina et al., 2014). Additionally, an excellent FIT_AAOC boosts market knowledge learning. Measuring how FIT_AAOC can better impact organizational performance and makes the present work unique.

Complementary capabilities should be integrated by teams of technologists and scientists that manage complex and sophisticated technological knowledge, according to Cohen and Levinthal (1990). This seminal work regarding market information learning, before the analytics boom, already indicated that technologies support the market knowledge, impacting other marketing capabilities using absorptive capacity (ACAP). Therefore, analytics can improve marketing capabilities like customer lifecycle assessment, loyalty, and reward programs, pricing, segmentation, and personalization (Wedel & Kannan, 2016).

Organizations with good FIT_AAOC can reconfigure capabilities and learning processes; however, to accomplish this, analytics need to improve marketing capabilities and exploitative processes, if there are preexisting procedures/routines. Existing literature argues that IT related capabilities are enablers for marketing capabilities (Barrales-Molina et al., 2014; Wang, Hu, & Hu, 2013), which indicates the dependence of some capabilities on others. Additionally, there is

evidence that technology effectiveness and IT related capabilities outputs resulted in a positive effect on preexisting capabilities (Boulding et al., 2005).

Absorptive capacity has been tested as a positive mediator between IT related capabilities and organizational performance, in conjunction with market knowledge (Liu, Ke, Wei, & Hua, 2013). Some IT related capabilities about analytics are assumed to have a direct effect on performance (Wamba et al., 2017) and organic culture also has some evidence of a direct effect on performance (Deshpandé & Farley, 2004; Wei et al., 2014).

FIT_AAOC translates organizational performance through marketing capabilities and absorptive capacity. From this discussion and using the terminology defined by Zhao, Lynch, and Chen (2010) on mediation, we formulated the central hypothesis:

H1. Marketing capabilities and absorptive capacity have a parallel mediating role between FIT_AAOC and organizational performance.

4 Method

PLS-SEM and OLS were selected for several reasons. Primarily, PLS-SEM is not a panacea (Henseler et al., 2014), but it is a modest and realistic technique to establish rigor in sophisticated modeling (Akter, Wamba, & Dewan, 2017), which is appropriate for testing early stages of theories (Hair et al. 2017), as in the present work. To date, there is no other work that examined the fit between culture and analytics.

The sample had 210 respondents from Brazil and 202 from European Union. The covariates included in the OLS regressions were an essential part of the analysis of the present multi-industry initiative: (i) organization size; (ii) age; (iii) whether the organization is a startup or not; (iv) if the most predominant approach is B2B or B2C; (v) whether the most predominant focus is on product or service; (vi) how the organization is technology dependent (single item from 1 to 7); (vii) environmental dynamism; (viii) location (Brazil versus EU). The log used for size (number of employees) was necessary to avoid non-linear behaviors.

4.1. Measurement model test

Multi-Group Analyses was performed using startup or not, service or product, B2B or B2C, organizational size, age, and early and late respondents. The PLS-MGA and the

Permutation algorithm with MICOM procedure were performed using the combination of these groups, resulting in p-values bigger than 0.05, i.e., rejecting the hypothesis of group differences. The same result was found for the European Union and Brazil samples. However, for profiles assessment, the PLS-MGA shows differences from IT, 56 registers, and non-IT respondents, 356 registers, then only non-IT respondents were used as the validation subsample (MacKenzie et al., 2011).

The FIT_AAOC's hierarchical components are treated using repeated indicators approach (Hair et al., 2017), and the results regarding the validity and reliability show Cronbach's alpha and composite reliability greater than 0.7 and AVE, greater than 0.5. They are measured for the first-order and second-order FIT_AAOC construct (MacKenzie et al., 2011). FIT_AAOC is measured as covariation following Yarbrough, Morgan, and Vorhies, (2011) and Venkatraman (1989) definitions. The external loads of convergent validity are greater than 0.7, and It was analyzed discriminant validity using the Fornell-Larcker criterion.

After the exclusion of two items, the cross-loading test showed no problem, confirming the validity at the construct level. We gathered data from a new sample, a holdout with only 300 first registers, a heuristic subsample, and tested it again (MacKenzie et al., 2011) confirming the exclusions.

4.2. Structural model test

According to Hair et al. (2017), the first step of the structural model is to evaluate collinearity with the VIF indicator, using as a parameter <5 , and the highest result was 3.391. Second, path coefficients were estimated using the Bootstrapping procedure, with 5000 subsamples with the option "no sign changes." All coefficients were significant (p-value <0.05).

The third step was to evaluate the determination coefficient that measures the model predictive accuracy. It is evaluated the Adjusted R-square values of 0.642 for ACAP, 0.543 for MC, and 0.467 for OP, which is considered near to moderate by Hair et al. (2011), parameter 0.5.

In step four, one sought to measure the size of the effect f square (f^2), which evaluates if any omitted constructs generate a substantive impact on the endogenous constructs. The result of FIT_AAOC on ACAP and MC is great; the result of MC and ACAP on OP is medium.

In the fifth step, it is tested the predictive relevance evaluated using the Blindfolding algorithm with the default configuration, omission distance equal to 7, cross-validated

redundancy, resulting in a Q^2 that represents MC and OP as medium (> 0.15) and ACAP as large (> 0.35) predictive relevance, parameters of Hair et al. (2017).

For a more in-depth analysis (see Table 1), the macro PROCESS of SPSS confirmed the H1, parallel mediation effect, (a1b1), and (a2b2) < 0.001 , but (c') was significant. The ordinary least squares (OLS) regression analysis with the summed items were used with template 4. It was used the procedures and parameters of Hayes (2013), and the results of the bootstrap with 10000 resample are summarized in Table 1 with results for R2, F statistics (degree of freedom 1 and 2), and p-values. It also includes unstandardized regression coefficients of direct paths (a1, a2, b1, b2, and c'), and the indirect paths a1b1 and a2b2 with significance level for bias-corrected 95% confidence intervals, and standard error (SE).

Table 1 - PROCESS OLS mediation results

Antecedent	Consequent								
	M(Absorptive Capacity)			M(Marketing capabilities)			Y(Organizational performance)		
	Coeff.	SE	p	Coeff.	SE	p	Coeff.	SE	p
X(FIT_AAOC)	.4326	.0274	<.001	.3136	.0249	<.001	.0965	.0344	.005
M(ACAP)	--	--	--	--	--	--	.1908	.0556	<.001
M(MC)	--	--	--	--	--	--	.2471	.0612	<.001
Constant	-.2534	.02686	NS	.9522	.2438	<.001	1.3223	.2579	<.001
	R2 = .638 p<.001			R2 = .5783 p<.001			R2 = .5034 p<.001		
	F(11,347) = 55,6748			F(11,347) = 43,2595			F(13,345) = 26,8974		

Source: Prepared by the authors (2020)

The indirect effect has to be analyzed together with the size of the effect f^2 , which evaluates if any omitted constructs generate a substantive impact on the endogenous constructs. This is necessary to avoid the epiphenomenal association, which means a mediator correlated with another omitted construct (Hayes, 2013). F2 results present a robust association between exogenous and endogenous constructs.

The indirect effect is a scale-bound metric, and then it is dependent on the construct's metrics. The measurement metrics in the current model are not inherently meaningful since they are responses to rating scales aggregated over multiple questions (Hayes, 2013). The completely standardized indirect effect is .3383 with bootstrap confidence interval [.2345, .4411] and can be compared with the completely standardized direct effect "c'_ps" value of .2040. This demonstrates the importance of the parallel mediation analysis, following the warnings about effect size indexes and instructions of Hayes (2013) in PROCESS version 3.3.

The indirect effect $(a1b1) + (a2b2)$ resulted in a value of .1600 (not standardized) and it was significant both for the normal theory test p-value [$<.001$] and for the bootstrap confidence interval [.1113, .2163] (Hayes, 2013). Therefore, H1 was confirmed and agreed with part of the information systems and marketing literature, which has a definite impact on practice and theories. The pairwise contrast between indirect effects (M2-M1) presents no significant difference between MC and ACAP effects, which means that one is not better than the other. The result of no significant difference implies that MC, from marketing literature, and ACAP, from information system and strategy literature, are both important to explain the phenomenon, interconnecting these pieces of literature.

The confirmed parallel mediation effect is important the higher the indirect effect value, in addition to the inexistence of direct effect (Zhao et al., 2010). Unfortunately, the direct effect was also confirmed. Despite the PLS result for f^2 , possible omitted construct, we suggest that further studies are necessary.

5. Discussions and Conclusions

The current work helps to explain how analytics uses market knowledge to improve organizational performance. It is theorized that analytics alone cannot improve performance, and pre-existing routines/processes and a fit with organizational culture are needed. The H1 hypothesis showed that organizations with good FIT_AAOC boost performance, passing through marketing capabilities and absorptive capacity. This result gives organic culture an enabler behavior for analytics-related capabilities.

H1 showed that adaptive analytics fitted with organic culture boost traditional marketing capabilities, such as customer lifecycle assessment, loyalty or reward programs, pricing, segmentation, and personalization, measured as marketing capabilities. Additionally, it improves previous information learning exploitative processes, measured as absorptive capacity.

The direct impact of FIT_AAOC can be explained by the first-order constructs' effects on performance, which has been presumed by the literature related to organic culture (Deshpandé & Farley, 2004) and analytics capabilities (Wamba et al., 2017; Louro et al., 2019), but this result suggests future studies.

FIT_AAOC impact is strong as there are preexisting routines/ processes. These results expand the knowledge for both managers and academics, in particular for those who take for granted the importance of analytics and are naïve regarding its value.

The present work's limitations are several: (i) cross-sectional data, (ii) possible unobserved heterogeneity, (iii) possible omitted variables because the mediations are not indirect-only (Zhao et al., 2010), (iv) possible omitted selection because of the unexplained behavior of IT professionals, (v) more covariables are possible, such as team age, type of innovation, leadership, etc.

In summary, the mechanism creates a fit construct, measured as covariation, marketing capabilities, and absorptive capacity on a multi-industry effort in the European Union and Brazil. The work shows a complex mechanism that better explains the impact on performance than the direct effect. The fitted culture and analytics with a parallel mediation expands analytics role on theory and interconnects, even more, the information systems and marketing strategy literature.

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