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RESEARCH ARTICLE

Meta-analysis of the corporate planning–organizational performance relationship: A research note

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Abstract

Research Summary: Despite a plethora of studies, the moderating effects of contingency factors regarding the relationship between corporate planning (CP) and organizational performance (OP) remain open to discussion. Our meta-analysis analyzes 183 independent study samples, 84 of which are examined for the first time. We expand on previous meta-analyses by correcting for measurement error and dichotomization, and we use moderation analyses and meta-analytical regressions to explain heterogeneity in these studies. We find evidence for the moderating effects of task interdependence and uncertainty avoidance as contingency factors. Unexpectedly, we identify an interaction of the measurements of OP and CP with uncertainty avoidance. Our results provide new insights into the relationship between CP and OP.

Management Summary: Managers who may doubt whether planning is still fruitful in turbulent times obtain a clear answer from our study: Yes, it is. CP is definitely correlated with OP. The effect sizes are stable

As recommended by Tomi Laamanen (associate editor of *SMJ*) we focus in this research note on our novel empirical findings by providing a more comprehensive meta-analysis of the CP–OP relationship that incorporates additional contextual moderators and a larger number of studies than prior meta-analyses. An in-depth presentation of the methodological approach and the robustness analyses is provided in an additional online appendix.

over time and for different types of planning. However, the effect of CP on performance depends on the organizational context. Manufacturing firms benefit more than nonmanufacturing firms, and larger firms benefit more than smaller firms. Organizations in countries with high uncertainty avoidance show larger effects in relation to those in countries with low uncertainty avoidance. Finally, organizations facing high environmental uncertainty show higher effects of CP than organizations in more stable environments. However, the identified effects are conditional on the type of measurement of performance and CP.

KEYWORDS

contingency approach, corporate planning, organizational performance, meta-analysis, moderation effect

1 | INTRODUCTION AND MOTIVATION

A plethora of studies examine the impact of corporate planning (CP) on organizational performance (OP) (Wolf & Floyd, 2017). The results of this research stream have been regarded as contradictory, weak, and fragmented (e.g., Greenley, 1994; Pearce II, Freeman, & Robinson Jr, 1987). Eight meta-analyses of the relationship between CP and OP (the CP–OP relationship) report a positive but small effect size (i.e., Boyd, 1991; Brinckmann, Grichnik, & Kapsa, 2010; George, Walker, & Monster, 2019; Kürschner & Günther, 2012; McIlquham-Schmidt, 2005; Miller & Cardinal, 1994; Schwenk & Shrader, 1993; Shea-Van Fossen, Rothstein, & Korn, 2006). However, wide confidence intervals (CIs) indicate low precision of these estimates,[1] and the I^2 measure shows a high level of heterogeneity of the combined findings.[2]

Only four of these meta-analyses examine theoretical moderators that might explain this high level of heterogeneity (i.e., Brinckmann et al., 2010; George et al., 2019; Miller & Cardinal, 1994; Shea-Van Fossen et al., 2006). Organizational size exhibited no moderating effects in two studies (i.e., Miller & Cardinal, 1994; Shea-Van Fossen et al., 2006). Miller and Cardinal (1994) also found no moderating effect of capital intensity, but they found higher effect sizes in the case of greater environmental turbulence (i.e., a dimension of environmental uncertainty). Additionally, in a meta-analysis focusing on CP in small organizations, Brinckmann et al. (2010) found moderating effects of uncertainty avoidance and the development stage of small firms but no moderating effects for different forms of planning. George et al. (2019) did not find significant moderating effects for the public versus the private sector.

[1]For instance, Schwenk and Shrader (1993) report an effect size of $d = .415$, 95% CI = [.09, .75], $k = 6$ for the relationship between strategic planning and profitability in small organizations, whereas Kürschner and Günther (2012) report an effect size of $r = .110$, [.04, .18], $k = 25$ for the relationship between strategic planning and OP.

[2]For instance, in his meta-analyses, Boyd (1991) reports an effect size of $r = .151$, while we estimate an I^2 measure of heterogeneity of 73.01%.

The contingency approach offers a rich theoretical perspective for our meta-analysis to explain the high level of heterogeneity in primary studies and to reconcile the findings of previous meta-analyses. The development of a contingency theory of CP (e.g., Grinyer, Al-Bazzaz, & Yasai-Ardekani, 1986; Hamann, 2017), rooted in the contingency approach, has been facilitated by an encompassing research stream that examined CP in relation to its organizational and environmental context (Hamann, 2017; Wolf & Floyd, 2017). Most of these studies establish associations between CP and context factors only and do not consistently address the performance effects of fit, which are central to the contingency approach (e.g., Brews & Purohit, 2007; Grinyer et al., 1986; Lindsay & Rue, 1980).[3] Therefore, it remains unclear whether context factors, which have been demonstrated to be associated with CP, also yield superior OP when the CP system is in fit with them. We reconcile the two research streams regarding the performance effects and the contingency factors of CP by examining which contingency factors moderate the CP–OP relationship.

To address this research question, we meta-analytically synthesize the research stream on the performance effects of CP and examine the performance effects of a fit between CP and its contingency factors. Moreover, we expand on existing meta-analyses by analyzing the reasons for heterogeneity in the existing primary studies, as we explore contingency factors as theoretical moderators and study design characteristics as methodological moderators.

Theoretical moderators in our meta-analysis are contingency factors, which are exposed by the diversity in primary study samples that differ regarding, for example, the size, industrial context, or regional context of organizations. When CP systems are in fit with the contingency factors, the effect size of the CP–OP relationship differs depending on the organizational context. In our theoretical reasoning, we focus on task interdependence and uncertainty avoidance as contingency factors derived from the contingency approach of Donaldson (2001).

Methodological moderators relate to differences in the research design of primary studies and thus may explain the heterogeneous findings of these studies. This alternative explanation must be refuted to establish the performance-increasing effects of the fit between CP and its contingency factors. Five of the eight existing meta-analyses examined the following methodological moderators: (a) controls for industry effects, (b) measurement of CP, (c) measurement of OP, (d) sequence of measurement of CP and OP, (e) year of publication, and (f) journal quality (i.e., Brinckmann et al., 2010; George et al., 2019; McIlquham-Schmidt, 2005; Miller & Cardinal, 1994; Shea-Van Fossen et al., 2006). These articles differ with respect to the methodological moderator explored as well as their results. Our study tests the full set of these six potential methodological moderators, allowing for exploration of these contradictory results.

In sum, Wolf and Floyd (2017) conclude in their broad review of strategic planning research: "Notwithstanding a multitude of studies, empirical evidence for a positive relationship between planning and firm performance remains inconclusive, particularly with respect to the role of environmental and organizational contingencies in this relationship."

The nonsignificant or ambiguous results of moderator analyses in previous meta-analyses may be driven by the limitations of these analyses, which we address in our research design. First, we adopt the Hunter and Schmidt approach (H&S approach) for meta-analyses

[3]The contingency approach differentiates between context and contingency factors (Donaldson, 2001). Context factors are defined as all aspects outside the system under investigation, whereas contingency factors are context factors that moderate the relationship between a system and its performance. Therefore, a system may yield superior performance when it is in fit with its contingency factors. However, empirical studies on CP in its context rarely exploit the rich theoretical rationale offered by the contingency approach because many authors do not explicitly state their theoretical foundation (Wolf & Floyd, 2017).

(see the newest edition: Schmidt & Hunter, 2015). In expanding previous meta-analyses, the H&S approach allows us to correct for measurement error in and dichotomization of dependent and independent variables, which may superimpose theoretical moderators in previous meta-analyses because of missing corrections (Schmidt & Hunter, 2015).[4] Second, previous meta-analyses cover between 14 and 88 studies. We expand on these meta-analyses by including 183 independent study samples, with a combined sample size of 30,246 organizations from 158 publications in two languages (English and German). Our study sample includes all studies from previous meta-analyses and adds 84 previously unexamined studies. Third, we expand on previous meta-analyses by researching the moderating performance effects of task interdependence and uncertainty avoidance while also controlling for the effects of organizational size and environmental uncertainty, four contingency factors for which sufficient data in primary studies are available. Our results show that the effect size of the CP–OP relationship varies with task interdependence and uncertainty avoidance. Fourth, we add to previous meta-analyses by combining the effects of theoretical and methodological moderators using meta-regression analyses. We provide evidence of interactions between the measurement of CP and uncertainty avoidance. The moderating effect of uncertainty avoidance is, in contrast to task interdependence, conditional on different measurements of OP.

The remainder of this manuscript is structured as follows. In the next section, we provide an abbreviated explanation of our theoretical framework. We then briefly outline our methodical approach. Next, we present the findings of our main and selected robustness analyses. We conclude with a brief discussion of our findings, including implications for future research.

2 | THEORETICAL FRAMEWORK

Corporate planning has been discussed for decades and can be defined following de Smit and Rade (1980) as a formal, explicit, and systematic organizational decision-making process.[5] In our study, this relatively broad concept of CP is captured by the construct of corporate planning sophistication (CPS). An organization's CPS occurs along a continuum that ranges from no formal to a full-fledged CP system encompassing all subprocesses of planning (i.e., strategy formulation, long-range planning, action planning, and budgeting) (e.g., Capon, Farley, & Hulbert, 1994).

Organizational performance is defined as "the economic outcomes resulting from the interplay among an organization's attributes, actions, and environment" (Combs, Crook, & Shook, 2005). In this sense, economic outcomes cover all organizational results regarding profitability, liquidity, growth, and stock market performance (Hamann, Schiemann, Bellora, & Guenther, 2013). Consequently, OP differs from related performance concepts, such as operational performance (i.e., all noneconomic outcomes obtained from different organizational activities), corporate social performance, and corporate environmental performance (Hamann et al., 2013). To avoid additional heterogeneity caused by different performance concepts, we focus on OP in our study and preclude all noneconomic performance effects of CP. In addition, primary studies on the CP–OP relationship focus mostly on the economic measures of OP (Rudd, Greenley, Beatson, & Lings, 2008).

[4]Our results in Table 1 show that both corrections increase the main effect size from $r = .158$, 95% CI = [.136, .180] to $r = .198$ [.171, .225] and the variance explained (in the primary studies) from 25.3 to 34.3%.

[5]In the literature, CP appears to be synonymous with strategic planning in a comprehensive sense (as early as the 1970s, Saunders & Tuggle, 1977, and recently, Wolf & Floyd, 2017).

The contingency approach originated in organizational science in the 1960s based on the pioneering studies of Burns and Stalker (1961), Woodward (1965), Lawrence and Lorsch (1967), Thompson (1967), and Child (1975). These studies led to the development of the contingency theory of organizations, currently the most advanced theoretical application of the contingency approach. Donaldson (2001) provided an in-depth analysis of the pioneering works above, follow-up studies, and related empirical evidence. He argued that all potential contingencies of organizations can be meaningfully reduced to three common underlying contingency factors: organizational size, task interdependence, and task uncertainty. In contrast, a plethora of contingencies of CP have been proposed.[6] Hamann (2017) finds that at least 30 different contingencies have been proposed and examined with mixed results. Thus, no comprehensive and parsimonious set of contingency factors of CP has been established in the literature. Therefore, we follow Donaldson (2001, 2006) and select the three contingency factors highlighted by him for our study.

With regard to (national) culture, pioneering studies have developed preliminary ideas (e.g., Lawrence & Lorsch, 1967; Thompson, 1967), and subsequently, organizational science researchers have emphasized culture as a contingency factor for organizations (e.g., Pennings, 1992; Zeffane, 1989). In this regard, uncertainty avoidance seems to be an important dimension of national culture because it concerns intolerance of ambiguity (Hofstede, 2001). Such ambiguity, in turn, results from environmental or task uncertainty, which thus establishes a link to this contingency factor of organizational structure. Thus, we add uncertainty avoidance to our analysis, which was also examined by the meta-analysis of Brinckmann et al. (2010). We focus on the less researched effects of fit between CP and task interdependence and uncertainty avoidance but also report the effects of organizational size and environmental uncertainty in our results.

Task interdependence is related to the level of connection between organizational activities, which can be indirect, sequential, or reciprocal (Donaldson, 2001). Increasing task interdependence increases the integration and coordination requirements of organizations (Pennings, 1992) and leads to greater centralization at the expense of less formalization and structural differentiation in organizations (Donaldson, 2001). Thus, the integration, coordination, and control provided by highly sophisticated CP systems may fit organizations with high task interdependence. Manufacturing and service organizations differ significantly in their degrees of task interdependence. Differences are also present in other nonmanufacturing industries (e.g., financial services or retail and wholesale trade). In manufacturing organizations, innovation, production, sales, marketing, and distribution processes are highly interdependent because each of these value-adding processes depends on other processes to be conducted in time, on feedback from these processes, and on coordinated objectives across all processes (Miller & Cardinal, 1994). Manufacturing organizations benefit from the coordination of processes, integration of activities, and long-term thinking facilitated by CP because of high task interdependence in these organizations. Task interdependence is low in service organizations because (a) services are intangible and are immediately consumed by customers; (b) the customer and the service provider directly interact in the process of service delivery (Frohlich & Westbrook, 2002); and (c) the branches in service organizations operate independently of one another (Macintosh & Daft, 1987). Thus, service organizations should benefit from CP to a lesser extent than manufacturing organizations. Additionally, empirical studies show differences in

[6]Often cited factors are organizational size (e.g., Ghobadian, O'Regan, Thomas, & Liu, 2008; Grinyer et al., 1986), environmental uncertainty (e.g., Odom & Boxx, 1988; Rauch & Frese, 1998), task interdependence (e.g., Hendrick, 2003; Macintosh & Daft, 1987) national culture (e.g., Hoffman, 2007; Rauch, Frese, & Sonnentag, 2000), strategy (e.g., Yasai-Ardekani & Haug, 1997), industry (e.g., Ghobadian et al., 2008), ownership (e.g., Atuahene-Gima & Li, 2004), competition (e.g., Harris & Ogbonna, 2006), and technology (e.g., Grinyer et al., 1986).

CP between service and manufacturing organizations (e.g., Harris & Ogbonna, 2006; Rauch & Frese, 1998). Thus, we hypothesize the following:

> **Hypothesis (H1).** *CPS has a stronger positive relationship with OP in manufacturing organizations than in nonmanufacturing organizations.*

Uncertainty avoidance is a dimension of national culture that refers to intolerance of ambiguity. Ambiguity results from both an undetermined future and environmental uncertainty (Hofstede, 2001). In national cultures with high levels of uncertainty avoidance, people prefer technology, expert knowledge, rules, and bureaucracy to reduce their perceived ambiguity. Consequently, high levels of formalization and specialization fit national cultures with higher levels of uncertainty avoidance (Hofstede, 2001). CP is an important way for organizations to cope with uncertainty because it helps them minimize perceived uncertainty by providing managers with information about an organization, its environment, and its overall objectives (Amey, 1986). Therefore, managers in countries with high uncertainty avoidance may conduct CP with high intensity and implement plans with high rigidity. Managers in such countries may thus benefit from the broad information base, integrative achievements, and intense communication provided by CP (Brinckmann et al., 2010). Empirical studies document the association between uncertainty avoidance and CP (Capon, Farley, & Hulbert, 1980; Rauch et al., 2000). In sum, we hypothesize:

> **Hypothesis (H2).** *CPS has a stronger positive relationship with OP when uncertainty avoidance in an organization's national culture is greater.*

3 | RESEARCH DESIGN

To be as all-encompassing as possible, we used a five-step procedure to identify relevant publications.[7] We obtained 534 potentially relevant publications for our meta-analyses and excluded 376 publications for several theoretical and methodological reasons. The remaining 158 publications (i.e., 139 articles from 64 different journals and 19 nonjournal publications) of primary studies included 183 independent study samples.

We applied the Standard Industrial Classification (SIC) system to code *industry* affiliation, which indirectly represents *task interdependence*, and to distinguish between manufacturing and nonmanufacturing organizations.[8] The measurement of *uncertainty avoidance* was based on Hofstede's (2001) uncertainty avoidance index (UAI) of countries. We coded the countries in

[7]First, we conducted a structured, computerized search in 41 ranked academic journals in three research fields (i.e., strategic management, entrepreneurship, and management control). Second, we identified additional publications by scanning the reference lists of previously identified articles. Third, we conducted additional searches in Google Scholar and SSRN and obtained studies directly from researchers. Fourth, we examined the validity of our search strategy by comparing our list of identified publications with the publication lists of the eight existing meta-analyses and identified only seven additional publications in this step. Fifth, we excluded studies that did not address OP directly, where required meta-analytical data were unavailable, and all dependent study samples.

[8]We coded manufacturing (SIC division D); services (SIC division E and L); wholesale and retail trade (SIC division F and G); finance, insurance, and real estate (SIC division H); agriculture, forestry, and fishing (SIC division A); and construction (SIC division C). The last two groupings were excluded from our subgroup analysis because of their diverging business models and the small number of studies (one and two primary studies, respectively).

which the primary studies were conducted. A UAI was assigned to a study only if a primary study had been conducted in a single country.[9]

In addition, we control for the moderating effects of organizational size[10] and environmental uncertainty.[11] *Organizational size* was coded on subgroups of studies or study samples based on the number of employees.[12] Our coding of *environmental uncertainty* was based on sample descriptions in primary studies and the respective assessments of the authors of these studies.[13]

Following previous meta-analyses, we coded five methodological moderators. First, we coded *publication quality* by assigning journal ranks from the comprehensive 2013 journal quality list of the Australian Business Deans Council (ABDC).[14] Second, we coded the *year of publication*. Third, we coded the *sequence of data measurement* to distinguish between studies employing OP data from a period before the collection of CP data, from the same period, and from later periods. Fourth, we distinguished between perceptual (i.e., informants as a data source) and objective (i.e., external archival data source) *OP measurement* (Venkatraman & Ramanujam, 1987). Fifth, we differentiated between dichotomous (i.e., nonplanning vs. planning organizations) and continuous (e.g., the strategic planning scale of Boyd & Reuning-Elliott, 1998) *CPS measurement*.

A meta-analysis is a specific set of statistical methods that allow for estimating a population effect size from effect sizes reported in primary studies and for testing whether moderator variables can explain heterogeneity in effect sizes. We employed the H&S approach in our meta-analysis (Schmidt & Hunter, 2015). Compared with other meta-analytic approaches, the H&S approach can correct dichotomization and measurement error in both OP and CPS measures and integrate this information into the estimation of the population effect size. This approach

[9]We formed two groups of countries with low and high UAI by dividing the empirical range of UAI at its midpoint. The lowest UAI is 8 for Singapore, and the highest UAI is 112 for Greece (Hofstede, 2001). Thus, the midpoint is 60. Because of the large number of studies conducted in the United States and the strong heterogeneity of the effect sizes of these studies, we excluded U.S. studies from this subgroup analysis.

[10]*Organizational size* is determined by the number of organizational members that must be managed (Donaldson, 2006). CP as a highly formalized management process provides the coordination and integration mechanisms that support the delegation of decision making and specialization especially of large organizations (Glaister, Dincer, Tatoglu, Demirbag, & Zaim, 2008). Additionally, correlation analyses demonstrate an association between CPS and organizational size (e.g., Ghobadian et al., 2008; Grinyer et al., 1986).

[11]*Environmental uncertainty* can be defined as managerial ambiguity that results from the absence, unreliability, or lack of timeliness of information about an organization's context (Yasai-Ardekani & Haug, 1997). Related to environmental uncertainty is the concept of task uncertainty (Thompson, 1967), which, following Donaldson (2001), is a main contingency factor of organizational structure. High environmental uncertainty causes high task uncertainty, which fits organizational structures with high levels of decentralization and low levels of formalization. Highly sophisticated CP systems fit highly decentralized organizations that are subject to high task uncertainty caused by high environmental uncertainty. Empirical studies demonstrate the association between environmental uncertainty (or one of its dimensions) and CP (e.g., Atuahene-Gima & Li, 2004; Odom & Boxx, 1988; Rauch & Frese, 1998).

[12]We applied the definition of small and medium-sized organizations proposed by the European Commission (2003). We combined subgroups if a study sample spanned two of the size categories above. Thus, we coded a total of five subgroups: (a) small organizations only, (b) small and medium-sized organizations, (c) medium-sized organizations only, (d) medium-sized and large organizations, and (e) large organizations only.

[13]Fourteen studies directly measured environmental uncertainty and compared subgroups of high and low environmental uncertainty (e.g., Glaister et al., 2008; Priem, Rasheed, & Kotulic, 1995).

[14]The ABDC journal quality list rating is published by the Australian Business Deans Council and encompasses 2,767 journals in one comprehensive ranking. This ranking covers 145 of our 183 independent study samples. We also conducted a related subgroup analysis with the journal rankings of the Association of Business Schools (ABS) Academic Journal Quality Guide from March 2010 and the JOURQUAL 3.0 ranking published by the German Academic Association of Business Research from February 2015. The results are similar across all three journal rankings and are available upon request from the authors.

requires coding the effect size statistics, data concerning the reliability and dichotomization of measures, and the sample size.

We applied a two-step procedure in our moderator analysis. First, we examined whether the effect sizes were all from a homogeneous population of effect sizes. Heterogeneity in effect sizes arises when the distribution of observed effect sizes is not merely the result of sampling error and other artifacts, which indicates the presence of theoretical moderators.[15] Second, we conducted separate meta-analyses for subgroups of studies regarding the theoretical moderators. For each subgroup, we calculated the mean correlation and the 95% CI around this mean, as recommended by Schmidt and Hunter (2015).[16] Additionally, as one of different robustness analyses, we employed meta-regressions to examine the interaction effects of the hypothesized theoretical moderators with the five methodological moderators.[17]

4 | RESULTS

The results of our meta-analysis are presented in Table 1. The overall effect size of the CP–OP relationship corrected for dichotomization and measurement error is $r = .198$, [.171, .225], with $k = 183$, which corresponds to a small- to medium-sized effect following Cohen's (1988) classification. The narrow CI indicates a reasonably precise effect size estimate. The proportion of the variance of individually corrected correlations explained by sampling error and other artifacts Var_{exp} is 34.3%, indicating a high level of heterogeneity warranting further moderator analyses.

The analysis of the main effect between CPS and OP shows, first, that the effect size based on corrected correlations is larger than that based on observed (i.e., uncorrected) correlations because the corrected artifacts attenuate the effect sizes of these observed correlations. Second, heterogeneity in the observed correlations (Var_{exp} only 25.3%) was higher than that in the remaining corrected correlations (34.3%). This result highlights the potential of artifacts to bias moderator analyses and the contribution of artifact correction to expanding previous meta-analyses. In addition, as a file drawer analysis adjusted to the H&S approach (Schmidt & Hunter, 2015) suggests that at least 541 additional zero-effect studies are required to reduce the main effect size to $r = .05$,[18] publication bias might not be as serious an issue for our meta-analysis as it might have been for previous meta-analyses with their respective small numbers of study samples.

The differences in effect sizes between subgroups of organizations from different industries indicate that *task interdependence* is a contingency factor of CP. In manufacturing

[15]Following the 75% rule of Schmidt and Hunter (2015), we assess that if more than 75% of the variance in observed or corrected effect sizes was due to sampling error and other artifacts, then a reasonable conclusion would be that the remaining variance was also the result of uncorrected artifacts and that no theoretical moderators were present.

[16]Confidence intervals provide information about differences between the correlations in the subgroups and the precision of the estimates. Following Cumming (2012), effect sizes of subgroups are different if the point estimate of one subgroup is not in the CI of the other. We excluded a study sample from subgroup analyses if it includes organizations from all three size categories, from more than one SIC division, or from more than one country.

[17]We would like to thank an anonymous reviewer for suggesting meta-regression as a possible robustness analysis method for our study. We followed the recommendations of Stanley and Doucouliagos (2012) in conducting the meta-regressions and employed the macro of Wilson (2006) for SPSS software. Following Cohen (1988), we examined the statistical power of each meta-regression using G*Power 3.1 because of the limited number of study samples included in each meta-regression. Additional robustness analyses are presented in the Supporting Information.

[18]Five hundred and forty-one zero-effect studies are nearly three times the number of primary studies included in our meta-analysis and more than eight times the number of studies excluded because of missing data ($N = 66$).

TABLE 1 Meta-analyses of the CP–OP relationship

Sample description	*k*	*N*	*r*	95% CI LL	95% CI UL	80% CV LL	80% CV UL	Var_{exp}
Full sample								
Observed correlations	183	30,246	.158	.136	.180	−.010	.325	25.3%
Corrected correlations	183	30,246	.198	.171	.225	.002	.393	34.3%
Task interdependence (H1)								
Manufacturing	67	5,946	.238	.197	.280	.093	.383	57.7%
Nonmanufacturing	41	4,806	.151	.100	.202	−.011	.313	43.0%
Retail and wholesale	6	316	.091	−.003	.214	.091	.091	100.0%
Service	17	2,580	.164	.099	.230	.038	.291	49.1%
Finance and real estate	14	1,480	.132	.018	.245	−.103	.367	28.1%
Public and nonprofit	4	430	.180	.072	.288	.154	.206	96.6%
Uncertainty avoidance (H2)								
Low uncertainty avoidance	52	9,731	.147	.091	.202	−.069	.363	31.2%
High uncertainty avoidance	24	6,211	.196	.128	.264	.028	.364	40.6%
Organizational size								
Small organizations (combined)	72	12,345	.179	.145	.214	.052	.305	56.0%
Small organizations	34	4,847	.194	.136	.253	.035	.354	48.8%
Small and medium organizations	35	7,389	.173	.131	.215	.080	.266	66.5%
Medium organizations	3	109	−.013	−.240	.214	−.083	.057	92.7%
Large organizations (combined)	60	7,751	.262	.219	.306	.091	.434	39.1%
Medium and large organizations	27	4,093	.295	.233	.356	.134	.455	40.4%
Large organizations	33	3,658	.226	.166	.285	.054	.397	41.3%
Environmental uncertainty								
Low uncertainty	19	1,598	.207	.130	.284	.058	.355	54.2%
High uncertainty	31	4,309	.112	.023	.200	−.178	.401	18.2%

Abbreviations: 80% CV, 80% credibility interval with its lower and upper limits; *k*, number of independent samples; LL, lower limit; *N*, total sample size; 95% CI, 95% confidence interval with its lower and upper limits; *r*, mean correlation; UL, upper limit; Var_{exp}, variance explained by study artifacts.

organizations, the effect size is $r = .238$ [.197, .280]. The effect size in nonmanufacturing organizations[19] is smaller, $r = .151$ [.100, .202], and is not included in the CI of manufacturing organizations. The overlap of both CIs is comparably small. Again, both CIs indicate that the effect size estimates have a moderate level of precision. However, the remaining level of heterogeneity was substantial in both subgroups. In general, these findings corroborate hypothesis H1.

When conducting a subgroup analysis, *uncertainty avoidance* does not show a moderating effect on the CP–OP relationship. The effect size for organizations in countries with low uncertainty avoidance is $r = .147$ [.091, .202], which is smaller than the effect size for organizations

[19]The effect sizes of four nonmanufacturing industries are combined into one subgroup of nonmanufacturing organizations.

in countries with high uncertainty avoidance at $r = .196$ [.128, .264]. However, both point estimates are included in the other CI. These estimates are not very precise, as indicated by the wide CIs, which may result from the small number of study samples, particularly from the high uncertainty avoidance subgroup. Furthermore, both values for variance explained indicate high heterogeneity and the need for further analyses. Thus far, these findings do not support hypothesis H2.

In addition, *organizational size* moderates the relationship between CPS and OP and is thus a contingency factor of CP. The effect size for the subgroup of (combined) small organizations is $r = .179$, CI = [.145, .214], whereas for the subgroup of (combined) large organizations, the effect size is larger with $r = .262$, [.219, .306]. *Environmental uncertainty* also moderates the CP–OP relationship. Contrary to theoretical reasoning, the effect size in organizations in high uncertainty environments ($r = .112$; [.023, .200]) is smaller than that in low uncertainty environments ($r = .207$; [.130, .284]). Because of the small number of independent samples ($k = 19$ and $k = 31$), neither estimate is very precise, as indicated by the wide CIs. Moreover, the level of heterogeneity is substantial, particularly in the subgroup with high environmental uncertainty.

In untabulated analyses, our results are robust when the analysis is restricted to North American studies only and when CP is differentiated in strategic, operational, or business planning. The results are also robust for publication quality, year of publication, and sequence of data measurement. We find moderating effects of the methodological moderators OP and CPS measurement.[20]

In our main robustness analyses, we conducted different meta-regression analyses (Table 2). The base model, which includes only methodological moderators, shows that only the two variables for OP and CPS measurement ($\beta = -.257$ and $\beta = .101$) are different from zero, with very low p-values of $p < .0001$ and $p = .031$, respectively.[21] The other meta-regression models explore the interaction between these two methodological moderators and the four theoretical moderators.[22]

First, the term for *manufacturing organizations* is positive ($\beta = .298$ and $\beta = .416$), with low p-values in both models ($p < .0001$ and $p = .042$). These findings replicate our main findings and support task interdependence as a contingency factor of CP and thus hypothesis H1. Both interaction terms with the two methodological moderators are negative with high p-values. Thus, the higher effect sizes for manufacturing organizations are robust for both the OP and CPS measurements.

Second, the meta-regression model (4), which also controls for the five methodological moderators, shows that the term for *uncertainty avoidance* is positive with a low p-value ($\beta = .125$; $p < .062$), which is contrary to the above subgroup analyses. This finding supports H2. This term becomes negative with a large p-value ($\beta = -.215$; $p = .244$) if we include terms for the interaction with OP and CPS measurement in model (5). However, the interaction term between uncertainty avoidance and OP measurement is positive ($\beta = .251$) with a relatively low p-value of $p = .056$. Furthermore, the interaction term between uncertainty avoidance and CPS measurement is positive with a p-value of .101. Thus, differences in the hypothesized direction are evident only if OP is measured objectively and if CPS is measured continuously compared with a dichotomous measurement approach. This finding implies that organizations in cultures characterized by high uncertainty avoidance require highly sophisticated CP systems to increase OP.

[20]These results are presented in the accompanying Supporting Information.

[21]For A-journals, we also obtain a coefficient with a low p-value; however, for other journal rankings, the p-values are high.

[22]Analyzing more than one theoretical moderator is not possible, as the sample size would be too low due to the limited availability of data on theoretical moderators in primary studies. In untabulated results, an additional hierarchical moderator analysis following Schmidt and Hunter (2015) confirmed the findings of our meta-regressions.

TABLE 2 Meta-regression analysis of the corporate planning sophistication–organizational performance relationship

		Contingency factors							
	Base model	Task interdependence (H1)		Uncertainty avoidance (H2)		Organizational size		Environmental uncertainty	
Moderator variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
Methodological moderators									
ABDC A*[a]	−.043 (.434)	.004 (.966)	.034 (.735)	**−.140 (.074)**	**−.180 (.026)**	.052 (.513)	.096 (.232)	−.199 (.131)	**−.248 (.061)**
ABDC A[a]	**.105 (.046)**	.033 (.719)	.042 (.655)	**.126 (.087)**	.119 (.109)	**.193 (.010)**	**.180 (.020)**	.065 (.486)	.061 (.516)
ABDC B[a]	.046 (.312)	.114 (.163)	.127 (.128)	.066 (.281)	.056 (.356)	.044 (.484)	.094 (.134)	**.246 (.002)**	**.247 (.002)**
ABDC C[a]	.034 (.461)	.077 (.388)	.085 (.374)	.045 (.464)	−.016 (.822)	.077 (.248)	.108 (.110)	.037 (.663)	−.078 (.396)
Year	−.031 (.492)	−.036 (.640)	−.035 (.651)	.044 (.510)	−.001 (.993)	−.126 (.043)	**−.200 (.002)**	−.144 (.278)	−.053 (.700)
OP and CPS measured at once[a]	.004 (.945)	**.147 (.091)**	**.156 (.073)**	−.116 (.196)	−.105 (.259)	.014 (.873)	−.132 (.145)	−.121 (.319)	**−.240 (.058)**
OP measured after CPS[a]	−.016 (.742)	.001 (.988)	.024 (.748)	**−.153 (.079)**	**−.165 (.061)**	.021 (.787)	−.065 (.415)	−.122 (.425)	−.247 (.117)
Objective OP measurement[a]	**−.257 (.000)**	.072 (.403)	.198 (.108)	**−.201 (.005)**	**−.289 (.001)**	**−.234 (.001)**	.011 (.903)	−.073 (.485)	.101 (.547)
Continuous CPS measurement[a]	**.101 (.031)**	**.334 (.000)**	**.316 (.008)**	.009 (.915)	−.037 (.677)	.075 (.258)	.085 (.267)	.168 (.122)	**.751 (.000)**
Theoretical moderators									
Manufacturing organizations[a]		**.298 (.000)**	**.416 (.042)**						
High uncertainty avoidance[a]				**.125 (.062)**	−.215 (.244)				
Large organizations[a]						**.160 (.011)**	**.381 (.039)**		
High environmental uncertainty[a]								−.060 (.472)	**.571 (.016)**
Interaction terms									
Theoretical moderator × objective OP measurement			−.204 (.146)		**.251 (.056)**		**−.526 (.000)**		−.216 (.281)
Theoretical moderator × continuous CPS measurement			−.020 (.913)		.227 (.101)		.100 (.556)		**−.709 (.000)**

TABLE 2 (Continued)

		Contingency factors							
	Base model	Task interdependence (H1)		Uncertainty avoidance (H2)		Organizational size		Environmental uncertainty	
Moderator variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
Quality criteria									
R^2	.122	.221	.231	.159	.171	.156	.247	.229	.290
Q_{Model}	81.96 (.000)	49.09 (.000)	51.34 (.000)	54.95 (.000)	59.01 (.000)	52.30 (.000)	82.92 (.000)	48.16 (.000)	60.84 (.000)
$Q_{Residual}$	591.23 (.000)	172.94 (.000)	170.69 (.000)	290.57 (.000)	286.53 (.000)	283.03 (.000)	252.40 (.000)	162.02 (.000)	149.34 (.000)
k	175	104	104	70	70	126	126	47	47
Power analysis[b]									
f^2	.139	.284	.300	.189	.206	.185	.328	.297	.408
Post hoc power	.998	.999	.999	.948	.963	.997	.999	.955	.990

Note: The dependent variable is the corrected correlation for the CPS–OP relationship. Weighted least square regressions employing weights based on information content (Schmidt & Hunter, 2015). Exact *p*-values are reported in parentheses.

Abbreviations: ABDC, Australian Business Deans Council Journal Rankings List 2013; CPS, corporate planning sophistication; f^2, effect size index of linear multiple regression; k, number of independent samples; OP, organizational performance.

[a]Moderator represented as dummy variable in regression analysis.

[b]Power analysis following Cohen (1988) with $\alpha = .05$, two-tailed.

Third, both *organizational size* models replicate our above findings. In both models, the term for large organizations is positive ($\beta = .160$ and $\beta = .381$) with low p-values ($p = .011$ and $p = .039$). The interaction term between organizational size and OP measurement is negative ($\beta = -.526$) with a very low p-value ($p < .0001$). Thus, effect sizes in large organizations are smaller if measured with objective OP indicators. The term for *environmental uncertainty* becomes positive ($\beta = .571$) with a low p-value ($p = .016$) only in model (9) when controlling for the interactions of environmental uncertainty with the two methodological moderators. The interaction term between environmental uncertainty and CPS measurement is negative ($\beta = -.709$) with a very low p-value ($p < 0.001$). Effect sizes in organizations that face high environmental uncertainty are smaller if CPS is measured continuously, highlighting the relevance of measurement approaches in research designs. Moreover, compared with no planning, the step to implement a CP system is much more important than increasing the sophistication of these CP systems.

All nine meta-regressions showed satisfactory R^2 values and strong statistical power in post hoc analysis, even if the sample size was as small as the 47 study samples in models (8) and (9). Altogether, we found clear evidence of an interaction between the measurement of OP and both organizational size and uncertainty avoidance and between the measurement of CPS and both environmental uncertainty and uncertainty avoidance. In contrast, the hypothesized moderating effect of uncertainty avoidance is observed only when OP is measured objectively. Finally, the higher effect sizes for manufacturing organizations are robust for OP and CPS measurement.

5 | CONCLUSIONS

In general, our meta-analysis provides a clear answer to a decades-old question: Does (corporate) planning pay? The answer is definitely yes. CP pays for different degrees of task interdependence across countries with different levels of uncertainty avoidance but also for different organizational sizes and levels of environmental uncertainty. The characterization of research on the CP–OP relationship as contradictory, weak, and fragmented (e.g., Greenley, 1994; Pearce II et al., 1987) is no longer warranted.

Our analysis of the theoretical moderators shows that the overall positive effect between CPS and OP is conditional on task interdependence and uncertainty avoidance. Thus, for a large body of primary studies, these findings support theoretical conclusions from the underlying framework of contingency theory; CP pays differently depending on the contingency factors of each firm.

Task interdependence is a contingency factor of CP. We find a difference in effect sizes between manufacturing and nonmanufacturing organizations. However, industry affiliation is only a theoretically justified proxy of task interdependence. Future research should directly measure task interdependence at the organizational level and compare different levels of task interdependence with respect to (a) industry affiliation to further test our theoretical assumptions, (b) the relationship between CPS and OP to substantiate our results, and (c) different noneconomic benefits to enrich the theoretical explanation of CP benefits for firms with high task interdependence.

Furthermore, we find higher effect sizes in organizations from countries with high *uncertainty avoidance* supporting uncertainty avoidance as a contingency factor of CP. Our results deviate from the findings of Brinckmann et al. (2010), who find higher effect sizes for countries with low uncertainty avoidance. This finding may be explained by their study sample and measurement approach.[23] However, additional empirical research that examines the performance effects of CP in other high uncertainty avoidance countries, such as Belgium (UAI = 94), Brazil (UAI = 76), and Portugal (UAI = 104), may further substantiate our findings.

Concerning *organizational size*, we clarify empirical results that have been contradictory and heterogeneous in the literature.[24] In contrast to the meta-analyses of Miller and Cardinal (1994) and Shea-Van Fossen et al. (2006), we demonstrate a moderating effect of organizational size because of our encompassing set of independent samples and rigorous meta-analytical methods.

Finally, in contrast to Miller and Cardinal (1994), we find a negative effect of *environmental uncertainty* on the CP–OP relationship. This difference might be explained by their coding of this variable.[25] We find that the moderating effect of environmental uncertainty on the CP–OP relationship is conditional on the measurement of CPS. This finding is surprising and expands on previous meta-analyses. For high environmental uncertainty, the existence of a CP system, independent of its sophistication, increases OP, but it does not increase OP further as sophistication increases.

Notwithstanding our attempts to be as rigorous as possible, our meta-analytical approach suffers from at least three limitations. First, we were only able to investigate industry as a theoretical proxy with regard to task interdependence. This proxy is theoretically justified and partially supported by empirical research. However, additional empirical studies that directly examine the fit between task interdependence and CPS—in addition to the OP effects of this fit—are required to test our conclusions. Second, we are unable to directly investigate the interactions between contingency factors. We conducted meta-regression analyses with regard to two methodological moderators and four theoretical factors. We were unable to examine the interactions among the four theoretical factors because of the small number of study samples available in the literature reporting all of the necessary data. Consequently, empirical studies investigating the system fit of CPS and of all four contingency factors in combination would offer a substantial contribution to a more comprehensive contingency theory of CP. Third, we excluded 66 primary studies because the required data were not available. We approached all addressable authors; however, some authors whom we successfully contacted could not provide the required data because the stored data were no longer accessible.

Our study makes four contributions to the literature. First, we expand on the previous empirical and meta-analytical literature by offering a refined and more concise estimate of the effect size of the CP–OP relationship. Future researchers may investigate how the size of the effect in their specific study setting differs from our effect size, as recommended by Carlson and Ji (2011), to integrate meta-analytical findings into the research design of primary studies. Second, the performance effects of four contingency factors (task interdependence, uncertainty avoidance, organizational size, and environmental uncertainty) have been demonstrated across different methodological approaches. The more comprehensive and further developed meta-analytical approach helps to clarify contradictory or ambiguous results (e.g., concerning the

[23]Brinckmann et al. (2010) measure low uncertainty avoidance mostly for newly established small firms and for U.S. firms. In contrast, our subgroup of high uncertainty avoidance countries includes 24 study samples that originate from nine different countries, and we exclude all study samples of organizations from the United States.

[24]Some studies find no moderating effect (Capon et al., 1994; Ghobadian et al., 2008); others find a positive moderating effect (e.g., Miller & Toulouse, 1986; Powell, 1992) or a negative moderating effect (e.g., Walters, 1993).

[25]Miller and Cardinal (1994) implicitly assume that all organizations in studies that do not present information related to environmental turbulence face a moderate degree of environmental turbulence. We apply a more rigorous coding scheme by excluding study samples for which no information on environmental uncertainty is available.

roles of organizational size and environmental uncertainty) and explains the heterogeneity of primary empirical studies. Third, our meta-regression of both theoretical and methodological moderators expands on previous meta-analyses and signals important interaction effects between these types of moderators. Fourth, we corroborate the effects of two methodological moderators on the CP–OP relationship (i.e., perceptual vs. objective measurements of OP and dichotomous or continuous measurements of CPS). We recommend that researchers acknowledge these methodological issues in future studies. Thus, we expand on previous meta-analyses by revealing that the performance effects of contingency factors are conditional on the type of measurement of OP and CP. Our meta-analysis provides a foundation for future empirical research on the OP effects of CP.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available in the online appendix of this article.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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