



# Revisiting the influence of institutional forces on the written business plan: a replication study

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## Abstract

The present paper re-analyzes and extends a study on institutional forces and the written business plan (Honig and Karlsson in *J Manag* 30(1):29–48, 2004). We attempt to examine to what extent critical decision making is evident in model and variable choice, and whether the implications provided by systematic replication efforts may serve to provide additional and perhaps unrecognized theoretical and/or empirical observations. We find that the key result—formal business planning does not affect performance, does not hold. In fact, we find evidence that formal business planning affects survival but not profitability. The re-analysis also reveals, that institutional antecedents to formal planning appear to be fragile and prone to researcher biases due to different coding and assumptions. Our study underscores the consequences of access to original data and coding material, and to rely upon current methodological explanations for subsequent analyses.

**Keywords** Replication study · Business planning · PSED II · Research ethics

**JEL Classification** K30 · A11

## 1 Introduction

Science is built on previous scholarship and discoveries must be scientifically validated by independent scholars. Replication is necessary in order to create and establish general knowledge (Hubbard and Armstrong 1994). Replication provides insight into nuances that may or may not support existing research. As Hambrick asserts, the only way to ensure our knowledge is evidence-based is “to allow ample testing and replication” (2007).

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Proper replication necessitates careful methodological documentation that is frequently absent in management literature (Schwab and Starbuck 2017; Bergh et al. 2015). Only by systematically replicating can we learn nuances that may have very pertinent theoretical implications (Evanschitzky and Armstrong 2013; Easley et al. 2000). It is with this scholarly frame of reference that we introduce this replication study of the impact of business planning on the success and survival of nascent entrepreneurs, and it is to that that we now turn.

Entrepreneurship promotion continues to be a growing enterprise, consisting not only of a growing chorus of academic offerings, majors, graduate degrees, and Ph.D.'s, but also of increasing popularity in the non-academic sector, ranging from reality TV to 'dragon's den' and business competitions at the local levels. Much of this effort has historically been anchored in formal business planning, whose history has consisted of the specifying, structuring, training, evaluating, and competing of rather extensive documents attempting to forecast the financial and human resource trajectories of emergent businesses. We note that the concept of business planning, as well as its asserted importance, has always been a matter of debate. The field has largely been divided between those that believe business planning provides important goal setting and organizational advantages (Delmar and Shane 2004) and those that believe entrepreneurship is a more ephemeral, contextual, and unpredictable process (e.g. Sarasvathy 2001; Bhidé 2000). More recently, a growing cadre of proponents have embraced a highly 'slimmed down' business plan process focusing almost exclusively on soliciting customer feedback while avoiding creating an extended formal document (Osterwalder and Pigneur 2010; Keane et al. 2018). Others have focused on the non-rational legitimacy secured from appearing to follow normative processes (e.g. Honig and Karlsson 2004). This replication study is not designed to adjudicate the costs or benefits of business planning, as that would require precise longitudinal data unavailable to us. Rather, the study is designed to extensively examine the methodological processes involved in one well established study of entrepreneurial business planning that focussed on less rational outcomes predicted by institutional theory (Honig and Karlsson 2004).

Honig and Karlsson (2004; H&K thereafter) were among the first to remind us of the simple but vital fact that entrepreneurship relies on human agency and that humans are prone to external influences in their decision-making. Drawing on institutional theory, H&K argue that business plans are normative devices required by financiers. Business plans therefore serve two purposes: In a ceremonial way, business plans disclose information that document the entrepreneur's understanding of the norms of exchange, and are intended to legitimize the venture. Secondly, they might communicate information about the human or organizational capital, or market and product features. H&K (2004) were the first to challenge the rationality-based models to business planning. While others simply saw as it trade-off between costs and benefits, they acknowledged that an external impetus might be equally decisive in determining whether or not one should plan. The paper has sparked subsequent interest in both institutional theory and the contextual nature of entrepreneurial planning. According to Google Scholar, as of June 2018, the paper has been cited 465 times.

By re-examining this study using contemporary methods and models, we serve not only to evaluate the relative robustness of the initial findings but also to under-

score the nuances and methodological implications imposed by researchers that are often unavailable or unrecognized in management scholarship. Following Hubbard and Armstrong (1994), we therefore engage in a replication with extensions. In short, we attempt to examine to what extent critical decision making is evident in model and variable choice, and whether the implications provided by systematic replication efforts may serve to provide additional and perhaps unrecognized theoretical and/or empirical observations.

We pursued our replication using a novel approach. We obtained the complete data set on which the H&K study was conducted and obtained the corresponding IDs of observations used by H&K. We exactly replicated the H&K study with the exact coefficients, standard errors, and even log-likelihood and Chi square values. In the due course, we noted several discrepancies between the data used in the original study and the Swedish PSED userfile. Several observations had different values for key dependent and independent variables. We went through the entire dataset and listed every single discrepancy. This let us to believe that choices made by the original authors may have had an impact on the findings, which we further corroborated. We set three teams of doctoral students to work, attempting to replicate the H&K study to the best of their ability, following the methodological descriptions in the published article. This accomplished two goals: (1) it allowed us to examine the adequacy or inadequacy of methodological descriptions for the purposes of replication and (2) it allowed us to examine the impact and nuances of seemingly ‘minor’ variations in modeling on the eventual results.

Our findings showed that institutional antecedents to formal planning appear to be fragile and prone to researcher biases due to different coding and assumptions. In particular, the education variable was more strongly related and the industry was strong in the replication. However, coercion was somewhat surprisingly weak, probably as the operationalization of that variable was more generic.

This work also takes into account the theorized (yet untested) complex endogenous relations between institutional influences, the likelihood of planning, and the corresponding plan-performance relations. We see that it is particularly important to adopt a contextual lens because as the work in Honig and Karlsson (2004) notes, entrepreneurship in general, and planning in particular, is agentic. To this end, we find that the key result—formal business planning does not affect performance, does not hold when considering an endogeneity adjusted empirical perspective. Business planning in our re-analysis affects survival, which attest to business planners being able to gain legitimacy, but does not affect profitability. We therefore conclude that business planning leads to persistence only.

We continue as follows. We first discuss the outset of the H&K study on external pressures to write business plans. Second, we discuss the need to revisit the institutional influences in the planning decision and the business plan—performance relation using an endogenous decision framework. In doing so, we recognize the need to cope with variable and model uncertainty to arrive at replicable findings. Next, we discuss the dataset and the results. Lastly, we conclude our findings and discuss implications.

## 2 Theoretical background

### 2.1 Related literature on business planning

Drawing up a business plan is among the most widely recognized activities that entrepreneurs do and that are recommended to them. It involves collecting and analyzing relevant information to identify future tasks, risks, and opportunities, and deriving viable contingencies for future actions, and it usually exists in written form (Delmar and Shane 2003; Gruber 2007; Brinckmann et al. 2010). The value of a business plan for nascent entrepreneurs is widely debated in the academic literature, and its impact on future success remains ambiguous.

The literature on business planning has produced mixed findings that show by and large weakly positive plan-performance relationship (Schwenk and Shrader 1993; Brews and Hunt 1999). Early studies in the context of small firms, report a positive relationship (Schwenk and Shrader 1993) and work in the entrepreneurial marketing domain finds positive performance effects (Gruber 2007). The recent empirical entrepreneurship literature sees a number of empirical studies that deals with the planning-performance relationship. The impact, however varies strongly, providing positive, negative and non-significant results (Lange et al. 2007; Burke et al. 2010; Liao and Gartner 2006; Honig 2004). Importantly, Honig and Karlsson (2004 and Karlsson and Honig (2009) discuss survival (institutional) and financial performance (rational) explanations, with most of the evidence suggesting that planning affects survival but not performance. To reflect on the state of the literature a recent meta-study (Brinckmann et al. 2010) presents evidence on positive, albeit, small performance impacts of business planning on performance. Other work exemplifies methodological problems associated with the study of business planning and the general neglect of endogeneity that may substantially bias studies that are later sought for meta-inquiries.

In part, the existence of these mixed findings, have prompted scholars to question the theoretical premise of the efficacy of business plans and advocated more contingent approaches. Effectuation theory, for example, suggests that to navigate the gestation process successfully, entrepreneurs should first and foremost examine their own capabilities and resources, and based upon those attributes, attempt to iteratively design a course of action. Because they are, by nature, less specific in their approach, their resulting market activities will not be fixed according to ex-ante planning or beliefs, rather, they reflect a process whereby the entrepreneur slowly identifies a method of obtaining comparative advantage based on existing available resources (Sarasvathy 2001; Chandler et al. 2011).

Other work, has urged scholars to focus on moderators of the proposed relationship (Brinckmann et al. 2010), to apply different empirical methodologies (Greene and Hopp 2017; Burke et al. 2010), while others have suggested to model the selection into planning activities differently (Brinckmann and Kim 2015).

Finally, recent work in the entrepreneurship literature has called for a more nuanced understanding of endogeneity in the planning-performance relation. As such, that context in which individuals plan is typically studied in a piecemeal fashion, and ex

ante decisions are often mixed up together with ex post events and strategies (Zahra 2007; Burke et al. 2010).

## 2.2 Summary of replication study

We begin with a brief summary of the study we seek to replicate. Honig and Karlsson (2004), suggest that what shapes business plan selection are isomorphic pressures. Institutional pressures (coercive, mimetic, and normative) lead to the homogenization of nascent organizations development. In short, nascent entrepreneurs conduct formal business plan activities because different aspects of their institutional environments influence them to do so. Honig and Karlsson (2004) suggests that these sources of influence could be divided into the classical isomorphic pressures suggested by institutional theory, that is coercive, mimetic and normative pressures (DiMaggio and Powell 1983). To operationalize these isomorphic pressures, they used public support agencies as a proxy for coercive pressures; industry belonging as indicator of mimetic pressures, and business school attendance as an indicator of normative pressures.

Honig and Karlsson (2004) argue, though, that this screening function is largely symbolic. In essence, they set forth that business plans are legitimization devices that act as ‘ceremonial cues’ which communicate legitimacy to stakeholders. Honig and Samuelsson (2012) reinforce the perception that there is little value added to formal business plans either in monitoring or supporting venture performance. They find, for example, that once the pressure to acquire resources is removed, entrepreneurs no longer write or use formal business plans.

Hence, by and large formal business plan activities reflect these isomorphic pressures. Honig and Karlsson (2004) were among the first to explicitly model antecedents to planning activities and derive three hypotheses as to what drives an entrepreneur’s propensity to plan. We state these verbatim.

- Hypothesis 1 Nascent organizations whose founders contact public support agencies have a greater propensity to produce business plans than those without such contact.
- Hypothesis 2 Nascent organizations in industries where business planning is deeply rooted have a greater propensity to produce business plans than those in other industrial fields.
- Hypothesis 3 Nascent organizations whose founders have a business education have a greater propensity to produce business plans than those whose founders do not have a business education.

Subsequently, they go on to posit that formal planners are more likely to a) survive and b) reach profitability. This reflects the notion that formal planning provides benefits (e.g. faster decision making, better learning outcomes) making it more likely that formal planners go on to comply with the environment and successfully create a profitable firm because formal evaluation promotes the identification and exploitation of a business opportunity. We repeat these hypotheses verbatim in the following.

- Hypothesis 4 Producing business plans will increase the probability of a nascent organization’s survival.

Hypothesis 5 Producing business plans is positively correlated with the probability of a nascent organization's reaching profitability.

## 2.3 Findings of the original study

Honig and Karlsson begin their analysis with estimating logistic regression for the first three hypotheses. In doing so, coercive pressure is measured by a variable indicating whether "Contact with a business support agency" was reported. Isomorphic pressure is indicated by a dummy variable for the "manufacturing sector". Finally, normative pressure is based on a dummy variable indicating whether or not a nascent entrepreneur "had completed a business class". A formal business plan was derived from the question "Have you prepared a business plan?" and the confirmatory answer to the subsequent question, "What is the current form of your plan? Is it unwritten (in your head), informally written for internal use, formally prepared for external use, or something else?". A formal business was coded as one if the respondent indicated that they had formally written plans for external use. The underlying argument here, was that only a formal written plan fulfills the institutional requirements of actually being a business plan. Informally written, or in your head plans do not.

The results reported indicate support for hypotheses 1 and 2, but not for hypothesis 3.

Similarly, for hypothesis 4 and 5, survival and profitability are employed as dummy variables in a logistic regression framework." Honig and Karlsson (2004) employ two dependent variables. Survival was defined using a dummy variable that takes on the value of one, if the project survived throughout the Swedish PSED time horizon and zero if it was abandoned at any point in time. Profitability is coded as one if owners indicated that they were profitable at any of the survey interviews (at 6-, 12-, 18-, or 24-month interview points). As to the effect of business planning, H&K report no support for either of the hypotheses, although the coefficient for formal planning on survival was significant at the 10% level (which the authors interpret as not enough evidence in favour of hypothesis 4).

In summary, Honig and Karlsson (2004) were the first to theorize and document that formal business plans do not exist in a de-contextualized vacuum, but rather, that business planning is reflective of human agency reacting to external influences. In particular, coercive and mimetic pressures influence who is going to produce a formal business plan. More importantly though, the study also highlights that this very institutional context becomes part of the business planning journey. While the results support the view that external influences prompt planning, the plan itself is by and large reduced to being a symbolic instrument, without actual effect on survival and more importantly, without an impact on profitability.

### 3 Methods

#### 3.1 Results of replication using identical models

In the following we replicate and extend the results from Honig and Karlsson's (2004) study "Institutional forces and the written business plan".

The data is based on the Swedish PSED study for which individuals (between 16 and 70, with oversampling of 25–44 year olds) were randomly selected to participate. Respondents went through screening interviews, in which nascent (those in the process of starting a new venture) were selected from. The sample used in Honig and Karlsson (2004) comprised 396 nascent entrepreneurs, for whom outcome data (e.g. disbanded or experienced profitability) was observed over a 24 month period, with continuous re-interviewing.

In our replication study, we have access to the original data file—that is, the raw data that the original research team used. We have obtained the corresponding IDs of observations used in the original study. As a benchmark, we have therefore exactly replicated the H&K study. We obtain the exact coefficients, standard errors, and even log-likelihood and Chi square values as in the original study. We also checked the pairwise correlations between variables and came up with the exact correlations reported in the paper. Yet, we note tiny distortions by rounding errors in the original study in the second and third digit after the comma (numbers in the original have been rounded down almost exclusively). As a first result, we can confirm that the H&K study is fully replicable.

However, we noted that some discrepancies exist between the original study, the data used, and the Swedish PSED userfile. Several observations had different values for key dependent and independent variables. This might in fact be related to the very way the Swedish data has been collected and curated over time. The first publications that came out of the Swedish PSED took place simultaneously when the data was collected. There were studies that used the screening data, wave one and two and then up to the 24 month follow-up. The data was continuously consolidated by a data manager which could result in small differences between the file used in real time and the curated master files. In addition, there were two major files, one following persons and one following projects which could also have an impact on specific items especially across time. Each researcher using the original files also used different ways of dummy code and developed their variables; which over time could lead to small differences in mean values.

Importantly, this might effect the direct replicability of the H&K study using the Swedish PSED userfiles available. As a consequence, we have gone through the very study and listed all discrepancies in the data and provide a corrected version of the H&K study using the latest userfile. Noteworthy, the results stay by and large the same. Summary Statistics remain almost identical, yet regression coefficients vary slightly in size and level of significance. This provides yet another benchmark against which the other replication studies need to be compared to. We list the original codings of H&K in the Appendix alongside the corrected data for the Corrigendum version.

In the following, we had three groups of Ph.D. students in a class on “Applied Econometrics” to replicate the Honig and Karlsson study. The groups are comprised of Ph.D. students from several universities in Germany and Austria. All groups were given the same task of replicating the original study with the corresponding variables and number of observations, and adhering closely to the original methodology.<sup>1</sup> In the due course, we have also approached the original authors to corroborate judgments and coding. Both authors have provided insights and helped to clarify in case problems arose. In Table 1 and 2 we depict the exactly replicated results and the corrigendum alongside the three replication studies. The corrigendum corroborates the findings from the H&K study.

Firstly, the main focus is on the first three hypotheses and those who indicate that they have a formally written business plan (for external use). This variable serves as the dependent variable in three regressions and as the explanatory variable in two regressions. The three replication studies are able to replicate 83% of the signs reported in the original study, which attests to the generalizability of the reported results. Yet, as the individual coefficients report, there are various differences, especially in light of idiosyncratic interpretation of the data at hand. We report these results in Table 1.

Regarding “Contact with Assistance Agency,” one replication study confirms the significant positive effect reported in the original study, though the coefficient estimates differ ( $\beta = 0.959$ ), while the other two report an insignificant effect. The variable indicating whether or not someone took a business class is insignificant in two replication studies and positive and significant in one ( $\beta = 0.535$ ). The coefficient for the manufacturing variable is confirmed in all three replication studies. Hence, there are many discrepancies in the findings.

Depending on the assumptions, the studies report manufacturing and business classes taken as significant (Study One), but not contact with an agency. Also, Study Two would report manufacturing as the driving factor of business planning, but not the contact with the agency or the business classes taken. Lastly, Study Three finds contact with an agency to be the main force, but manufacturing is only significant at the 10% level. Study Three finds no effect for business classes taken. Importantly, though, not a single study reports similar findings for the three hypotheses.

Subsequently, all three replication studies re-estimate the effect of having a formal business plan on both survival and profitability. Results are reported in Table 2. Interestingly, the studies perform worse in the second stage regressions, predicting only 66% of the signs correctly. As to their findings, Honig and Karlsson (2004: 41) note that “Writing a formal business plan had a moderate coefficient increasing survival by 1.8, but failed to pass the  $p < .05$  significance level.” Thus, they consider Hypothesis 4 as not supported. All three studies find that a formal plan has an insignificant effect on profitability, which corroborates the original results. However, the studies report a positive and highly significant effect for formal business planning (study 1:  $\beta = 0.835$ ), and two effects that are almost identical to the original findings, yet pass the 5% level of significance (as opposed to being significant at the 10% level in both, the original and corrigendum dataset). Hence, there appears to be evidence in favor of Hypoth-

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<sup>1</sup> We contrast all variable coding for the original study (text statements from the article indicating variable coding) and the exact questions used for the replication study in the Appendix.

**Table 1** Summary of variable coefficients—dep. variable formal business plan

Variable	Honig/Karlsson (exact replication)	Honig/Karlsson (exact replication)	Honig/Karlsson (corrigendum)	Replication 1	Replication 2	Replication 3				
Years education	−0.002	−0.002	−0.003	−0.002	0.076	0.065	0.063	0.070	0.113*	0.105†
Years experience as manager	−0.001	0.007	0.007	0.014	0.01	0.011	0.007	0.015	0.017	0.020
Years work experience	−0.02	−0.02	−0.020	−0.020	−0.033*	−0.032	0.001†	0.002	0.008	0.008
Previous start-up experience	0.01	0.02	−0.010	0.020	0.262	0.3	0.008	0.026	0.074	0.071
Parents in business	0.35	0.37	0.340	0.380	−0.094	−0.149	−0.054	−0.077	0.034	0.000
Encouraged by friends or family	1.08**	1.07**	1.05**	1.02**	0.381	0.211	−0.225	−0.226	0.829**	0.881**
Close friends or neighbours in business	−0.34	−0.41	−0.330	−0.390	0.208	0.288	−0.023	−0.004	0.304	0.372
Member of a start-up team	0.32	0.39	0.270	0.380	0.187	0.205	0.436	0.410†	−0.242	−0.249

Table 1 continued

Variable	Honig/Karlsson (exact replication)	Honig/Karlsson (corrigendum)	Replication 1	Replication 2	Replication 3
Member of business network	0.79**	0.63*	0.330	0.702*	0.622* 0.282 0.234 0.079
Knew customers before start-up	0.06	0.16	0.070	0.150	0.121 -0.117 -0.170 -0.310 -0.337
Age	0.07**	0.07**	0.06*	0.048*	0.045** 0.023*** 0.022 0.036 0.034
Gender	-0.21	-0.25	-0.230	-0.290	-0.127 -0.005 0.025 0.088 0.000
Married	0.34	0.33	0.370	0.390	0.036 -0.038 0.009 0.072 0.029
Children	0.28	0.34	0.313	0.370	0.208 0.224 0.287 0.293 0.293
Contact with assistance agency	0.99***	0.99***	0.87**	0.275	0.474 0.346 0.959**
Manufacturing	0.82*	0.82*	0.70 <sup>†</sup>	0.886**	0.937*** 0.650 <sup>†</sup>
Business classes taken	0.43	0.43	0.65*	0.535*	0.370 -0.014
N	396	396	396	379	379 390 339 339

<sup>†</sup>  $p < 0.1$ \*  $p < 0.05$ \*\*  $p < 0.01$ \*\*\*  $p < 0.001$

**Table 2** Summary of variable coefficients—dep. variable survival and profitability

Variable	Survival				Profitability						
	Exact Replication	Corrigendum	Replication 1	Replication 2	Replication 3	Exact Replication	Corrigendum	Replication 1	Replication 2	Replication 3	
Years education	− 0.02	− 0.02	0.039	0.029	0.073	0.01	0.02	− 0.066	− 0.042	− 0.121*	
Years experience as manager	− 0.02	− 0.02	0.025	0.036	0.019	− 0.03	− 0.03	0.024	0.010	0.056†	
Years work experience	− 0.02	− 0.01	0.015	− 0.012	0.029	0.02	0.02	0.014	0.026	0.003	
Previous start-up experience	− 0.007	− 0.06	− 0.133	− 0.018	0.379	0.28†	0.34†	0.466†	0.188	0.435	
Parents in business	0.35	0.37	0.405	0.368	− 0.059	0.29	0.24	0.253***	0.540*	1.145***	
Encouraged by Friends or Family	− 0.12	− 0.14	0.125	0.055	0.044	0.008	− 0.02	1.072***	− 0.002	0.627†	
Close friends or neighbours in business	0.25	0.23	0.404	− 0.051	0.164	0.64*	0.52†	0.266†	0.470†	0.176	
Member of a start-up team	0.19	0.18	− 0.23	− 0.017	− 0.455	0.27	0.25	0.398	− 0.322	0.626	
Member of business network	1.51***	1.36***	0.633	0.914***	1.188**	1.16***	1.26***	0.848**	1.420***	1.369***	

Table 2 continued

Variable	Survival			Profitability						
	Exact Replication	Corrigendum	Replication 1	Replication 2	Replication 3	Exact Replication	Corrigendum	Replication 1	Replication 2	Replication 3
Knew customers before start-up	1.03***	0.98***	0.188	0.574*	1.196**	3.24***	3.25***	-0.643	1.092***	1.375**
Age	.05 <sup>†</sup>	0.03	0	0.000	-0.047 <sup>†</sup>	-0.008	-0.01	-0.001	-0.001	-0.015
Gender	-0.10	-0.06	0.015	0.070	-0.010	.65*	0.61*	0.293	-0.506 <sup>†</sup>	0.399
Married	0.39	0.38	0.769*	0.332	0.749	0.36	0.31	0.945**	0.726*	1.466**
Children	-0.50 <sup>†</sup>	-0.26	-0.243	-0.295	-0.276	-0.05	0.10	-0.368	-0.809**	-0.508
Contact with assistance agency	-0.70**	-0.64*	0.257	-0.009	0.027	0.17	0.06	0.358	0.112	0.494
Manufacturing	1.41**	1.20**	1.363*	1.107*	1.217**	0.24	0.17	1.096**	0.893*	1.445**
Business classes taken	0.2	0.24	-0.096	-0.096	0.494 <sup>†</sup>	0.06	0.19	0.03	-0.184	0.778*
Formal business plan	0.60 <sup>†</sup>	0.63 <sup>†</sup>	0.835**	0.586*	0.585*	0.2	0.24	0.014	-0.168	-0.473
N	396	396	379	390	339	396	396	379	390	339

<sup>†</sup>  $p < 0.1$ \*  $p < 0.05$ \*\*  $p < 0.01$ \*\*\*  $p < 0.001$

esis 4, which, however, is at odds with the original interpretation. This confirms the institutional theory interpretation, and since there is no evidence in favour of H5, it discards, the functional/rational explanation.

In sum, while some of the first stage estimates are broadly consistent with the original findings, we fail to reproduce the full set of effects reported in the original work. Hence, overall, there appears to be very mixed evidence as to the robustness of the findings concerning the institutional antecedents of business planning. The results of the three replications raise the question of whether the variables accurately represent institutional influences on formal business planning. In addition, as it concerns the second stage effect of business planning on performance we find contrary influences for the effect of plans on survival. We will explore the reasons for these discrepancies in the following.

### 3.2 Explanation for replication differences: Parameter uncertainty

With respect to working the underlying raw data, idiosyncratic choices and strategies may introduce unrecognized variable uncertainty. There are many reasonable and unreasonable approaches to evaluating data. In fact, because there is not always a direct measure available, researchers test hypotheses using various (and likely different) ways to operationalize variables and constructs. As Stroebe and Strack (2014) point out, there is uncertainty surrounding the decisions researchers make when operationalizing variables to test theories. Results may be affected by chance, misinterpretations, a different choice of methods, and (not necessarily fraudulent) discretion in researcher analytics.

To begin with, it is noteworthy that in Tables 1 and 2, each group reports a different number of observations. Hence, due to idiosyncratic decisions taken by each team some information was missing and subsequently variables could not be calculated. As such, some observations were omitted in the analysis and results are bound to be different. While Honig and Karlsson report 396 observations, the three replication studies have 379, 390, and 339, respectively.

We depict all variables reported in the original study in the Appendix (with text from the original source) and denote how they were operationalized originally and in the replication studies. We discuss in the following how the operationalization differs with respect to the variables used as main explanatory and dependent variables (those central to the hypotheses).

#### 3.2.1 Dependent variable

Honig and Karlsson (2004) report 57% of the firms becoming profitable and 22.5% having a formal business plan. Two studies (Study 1 and 3) condition their dependent variable on Question pp11 (Did your company make a profit or loss previous year of operations?) and pp13 (Do you expect your company to make a profit or a loss this year?). Hence, these studies are more inclusive in their approach by also including the expectation of profits. Another study (Study 2), conditions only on pp11, pp21, and pp31 (Did your company make a profit or loss in this year, 1998, 1997?; 0 = Break-

Even, 1 = Profit, 2 = Loss)". In summary, all three replication studies report lower profitability levels. Noteworthy, Honig and Karlsson (2004) derived their profitability measure from a different question "Does the monthly revenue exceed the monthly expenses?" and focused on operational profitability. This amounts to a difference of 15% from the different use of profitability measures.

With respect to survival, Honig and Karlsson (2004) report – 37.5% of the ventures as surviving. Possibly (and that is what the replication studies report) they refer to 1–0.375 of the ventures surviving, with 37% disbanding their efforts. One study follows the same procedure as the original study (Study 2: conditioning on sg14/sg24 "How would you describe the current status of this start-up effort? Is it now an operating business; still in an active start-up phase; still a start-up, but inactive; no longer being worked on by anybody; or something else?") and reports similar results with 29% of the ventures disbanding. Another study (Study 1) conditions on the indicated year of disbandment (question sa01yn\*) where there are some missing values that reduce observations. Still 27% of the ventures are reported as disbanded, which is comparable. Importantly, all other outcomes such as "resting" or "inactive" are not included in the measure as actively disbanded. Treating these 7% of the cases as disbanded would almost account for the differences to the Honig and Karlsson (2004) results. Interestingly, one study (Study 3) starts with defining those ventures that became profitable first (e.g. describe their status as operational) and then recoded those that report any other status subsequently. Here, survival is less inclusive and results in only 38% of the ventures that are treated as surviving (resting and inactive ventures included in the non-surviving measure). In a strict sense, this reflects the notion of Honig and Karlsson (2004: 36) who define survival as "continuance of a project throughout the time horizon of the project". Not working on a project anymore, is strictly speaking not really continuing on the project. Hence, there are strong discrepancies here as to how variables should or could be calculated.

As for the formal business planning variable, Honig and Karlsson (2004) report 22.5% formal planners, while all replication studies report higher numbers. While H&K use the first wave only, the replication studies also accounted for the dynamic nature of completing a business plan in subsequent months, which is not an unreasonable measure. In fact, the results in H&K seem to condition and be applicable to those that have a formal plan at the beginning of the survey, but not for those that complete the plan in the due course of the 24 month period. Hence, while the paper gives a definition this does not resemble the data collection effort closely. All in all, all three replication studies treated both responses an initial formal plan and subsequent formal preparation (coded as three) as a formal business plan, resulting in higher numbers in comparison to the original study.

### 3.2.2 Explanatory variables

As to the main explanatory variables, sector compositions are roughly similar and only affected by the number of observations. Concerning coercive pressures, a dummy variable was created identifying nascent entrepreneurs who indicated they had contact with a business support agency.

Yet, there are several questions that can be used to create this dichotomous variable. One study (Study 3) uses the answer to question cs01in00 (“Many programs to help new businesses get established have been developed. Federal, state, and local governments, universities, and voluntary associations sponsor them. Have you made contact with any such program?”). When using this question, the percentages derived resemble those published in the original study.

Unfortunately, and not directly indicated in the text, respondents are also asked questions regarding 7 different agencies with which they can make contact in three subsequent waves. When summing over all these agencies, the percentages (surprisingly) increase. In addition, it is not clear from the original writing, if only the first period is taken into account or subsequent periods. The number closest to the original paper (Study 3) only employ the initial wave, which strictly ensures that contact took place before planning started, though others may contact agencies subsequently and then begin to formally plan. Again, the original study took a static perspective here, while a dynamic perspective might be equally defensible. In fact, cases that talk to agencies during the 24 month period would be omitted by conditioning on the first wave solely. Also, respondents indicate the intensity of the contact. For example, the difference in summary statistics of some 20% could also be explained when deducting from the indicated existence of a contact, those contacts that made no use of the information provided. Again, several approaches and assumptions seem feasible, justifiable, and defensible.

Lastly, for the calculations of variables related to normative pressure, a variable indicating whether or not the respondents had taken business classes was introduced. To comply with the hypotheses, business classes should have been completed before a business plan was undertaken. One approach to ensure this would be to simply use the initial wave answers solely. Noteworthy here, H&K now takes a dynamic view and includes responses in month zero, six, and 12. One study (Study 2) uses answers only in the initial wave, two other studies use subsequent responses. Results are quite similar. Yet, none of the studies comes close to the original results reported. Interestingly, when instead of using the response to the question “Have you taken any classes or workshops on starting a business?” but rather the number of workshops reported gu01nn “How many classes or workshops have you taken part in?” all studies report numbers close to 0.45–0.5 (very close to the numbers published in the original paper). Yet, these represent not the percentage of people that took a business class, but rather the average number of classes over the sample. All in all, it is very difficult to reconcile these numbers from the variable definitions given in the text and hence, discrepancies between studies exist.

### 3.2.3 Summary re-construction of dependent and explanatory variables

In summary, while there is some resemblance in the numbers reported there are very many ways in which researchers can code or re-code their variables. In fact, the words and definitions given in the paper may (or may not) reflect what the authors did. Also, without having direct access to the data, the code books, and the coded variables it is very difficult to assess what really is going on most of the time. In fact, all researchers (including the original authors) made sensible and defensible assumptions about their

data coding, yet they differ in very many aspects. The question that naturally arises is whether these assumptions have a direct influence on the results reported. We restrict our discussion of discrepancies to the main dependent and explanatory variables used. Stata do files with exact coding are available as a supplement to this text. Descriptive statistics for other variables are reported in Table 3.

The complexity of the work we engage is bound to be driven by discretion and by defensible, debatable choices. But the more the discretionary factors play into the interpretability and generalizability of findings, the more important it becomes to spell out the assumptions, to provide alternatives, and to see how the initial results hold up. Keeping track of how one processes the data is important to allow other researchers to walk in one's shoes. In particular, for understanding the lower and upper boundaries of the estimates, it's important to see how outliers have been dealt with and how variables have been coded. All investigators need to apply rigor, not only to the method they choose, but also to the way they handle data.

### 3.3 Explanation for replication differences: Model uncertainty

In choosing the models they report, researchers have several degrees of freedom that make it difficult to assess the robustness of the findings. These areas include variable calculations, inclusion or exclusion, and specifying the underlying variable distribution. This may lead to curated model specifications, those that are more likely to report significant findings, that make it difficult for readers to assess the true nature of relationships (Young and Holsteen 2017: 4). This leads to model uncertainty. Our conviction of uncertainty is grounded in similar recent efforts in which Silberzahn and Uhlmann (2015) highlight the great variety of defensible conclusions that can be drawn from the same dataset, albeit with different assumptions and methods. As Ho et al. (2007: 232) argue, model selection is “difficult, fraught with ethical and methodological dilemmas, and not covered in any serious way in classical statistical texts.” Within the current context, Honig and Karlsson (2004) discuss between 14 and 17 control variables for either model estimated. In fact, with some 14–17 control variables, the number of possible unique variable compositions goes well into the hundred thousand possible combinations (permutation of variables). Findings can be strongly conditional on the nature and composition of control variables chosen. We would argue that the same can be said for reporting.

Building on work in econometrics (for example, Leamer 1983; Sala-i-Martin 1997; Sala-i-Martin et al. 2004), Young and Holsteen (2017) suggest a computational robustness model that addresses model uncertainty and provides an estimate about how model parameters change in repeated modeling. Moving forward, we should be interested in not only whether or not an effect is different from zero, but also whether the estimate is different from the results generated by other plausible models. It is especially important to rule out results that crucially depend on control variable constellations.

As to the three antecedents of formal business planning, there are 65,536 unique combinations of the control variables. We follow the model suggested in Young and Holsteen (2017) and estimate these models using all possible variable combinations. Results are reported in Table 4.

**Table 3** Summary Statistics

Variable	Exact replication	Corrigendum	Replication 1	Replication 2	Replication 3
Survival	-0.38	0.62	0.73	0.71	0.38
Profitability	0.57	0.57	0.36	0.31	0.39
Formal business plan	0.23	0.23	0.34	0.39	0.31
Contact with assistance agency	0.40	0.40	0.57	0.65	0.36
Manufacturing	0.12	0.11	0.15	0.12	0.14
Business classes taken	0.45	0.43	0.25	0.32	0.34
Years education	12.64	12.62	12.89	4.30	13.08
Years experience as manager	5.41	5.41	5.92	6.29	5.97
Years work experience	14.26	14.32	7.43	15.57	14.44
Previous start-up experience	0.41	0.41	0.44	0.28	0.56
Parents in business	0.49	0.49	0.49	0.49	0.50
Encouraged by friends or family	0.76	0.76	0.41	1.65	0.76
Close friends or neighbours in business	0.32	0.32	0.34	0.34	0.33
Member of a start-up team	0.57	0.57	0.79	0.60	0.88
Member of business network	0.27	0.29	0.18	0.30	0.27
Knew customers before start-up	0.40	0.40	0.09	0.40	0.26
Age	37.89	37.92	36.10	37.18	36.01
Gender	0.29	0.29	0.25	0.72	0.24
Married	0.75	0.74	0.77	0.78	0.82
Children	0.57	0.56	0.60	0.59	0.60
Observations	396	396	379	390	339

**Table 4** Robustness of First Stage Estimates

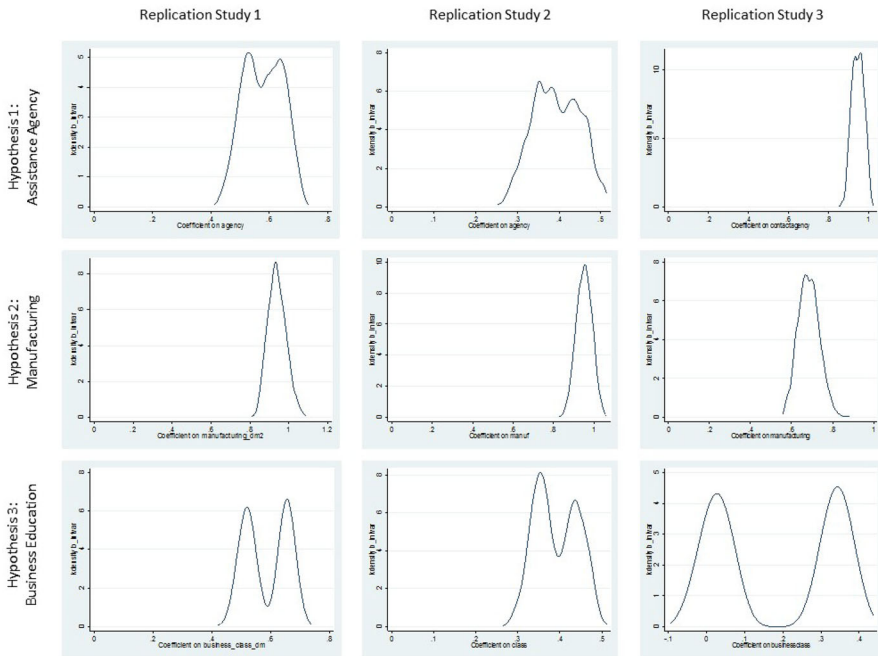
Explanatory var. formal business plan	Exact replication	Corrigendum	Replication 1	Replication 2	Replication 3
Dep. variable: survival					
Mean	0.663	0.689	0.935	0.615	0.614
Robustness ratio	2.047	2.162	2.999	2.362	2.18
Sign stability (%)	100	100	100	100	100
Significance rate (%)	71	82	100	100	85
Dep. variable: profitability					
Mean	0.299	0.313	0.188	-0.094	-0.228
Robustness ratio	0.924	0.993	0.688	-0.356	-0.729
Sign stability (%)	100	100	98	83	96
Significance rate (%)	0	0	0	0	0

For the variable “Contact with Assistance Agency,” we find that the results appear stable in the original file, with wide discrepancy among the replication studies. In the H&K sample, the estimated coefficient is positive in every possible combination of control variables, as evidenced by the stability of the sign. The robustness ratio, the mean divided by the total standard error, is 3.66. By the standard of a simple  $t$  test, this would be considered as highly significant. While it is significant in 92% of the models in Study 1 and significant in 100% of Study 3, it is significant in only 17% of the cases in Study 2. The average estimate across all models, including those that are theoretically unjustified, ranges from 0.39 to 0.95—close to the coefficient reported in the original study. The robustness ratio, though, would be considered as insignificant. Importantly, the coefficient estimate of the contact with the business agency strongly depends on the inclusion of the business classes variable. In fact, in the model specification reported in the original study, the effect for contact with the business agency would become significant if the variable business classes were omitted. In sum, the variable contact with the business agency appears to be stable in the original but sensitive in the replications.

For the variable manufacturing, we find that the results appear strongly robust. The estimated coefficient is positive in every possible combination of control variables and significant in close to a 100% of the models estimated in the original and in Studies 1 and 2, though, interestingly, in only 50% of the models in Study 3. The average estimate across all models ranges from 0.68 to 0.95, which includes the coefficient reported in the original study. The robustness ratio ranges from 1.9 to 2.9. Hence, the coefficient for manufacturing can be regarded as strongly robust.

We report the coefficient estimate for business classes taken. The estimated coefficient is positive in every possible combination of control variables in the original and Studies 1 and 2, though in only 87% of them in Study 3, but only significant in 53, 78, 13, and 0% of the cases. The average estimate across all models ranges from 0.18 to 0.59 (including the coefficient reported in the original paper). The robustness ratio ranges from 0.58 to 2.17. This would be considered as mostly insignificant, which corroborates the results reported in the original study. Yet, again, the effect of business classes taken strongly depends on the inclusion of the variable “Contact with Assistance Agency.” Again, “business classes” in the model reported in the paper become significant if the variable “Contact with Assistance Agency” is omitted. These two variables (which are theoretically justified) each appear to have an effect when included separately. However, both are highly contingent on the chosen set of control variables. Given the high degree of sensitivity between the “business class” and “assistance agency” variables, it would have made sense to investigate potential interaction effects between them. We graph the modelling distribution derived from the replication studies in Fig. 1 for the first stage regressions (H1–H3).

For the analysis of formal business planning on survival and profitability, there are some 131,000 unique combinations of variables. Results are reported in Table 5. For the effect of a formal business plan on survival we find that the average estimate across all models ranges from 0.614 to 0.935. The robustness ratio is 2.18 at the lower and 2.99 at the upper end. Again, this would be considered as strongly robust. The variable is positive in 100% and significant in almost 100% of the models estimated; only in Replication Study Three is it significant in 85% of the models. It is also only



**Fig. 1** Modelling distribution H1–H3 across replication studies

significant in 71% of the models originating from the original study. Hence, there is very strong evidence that having a formal business plan affects the survival of new ventures positively, but evidence is more fragile in the original study.

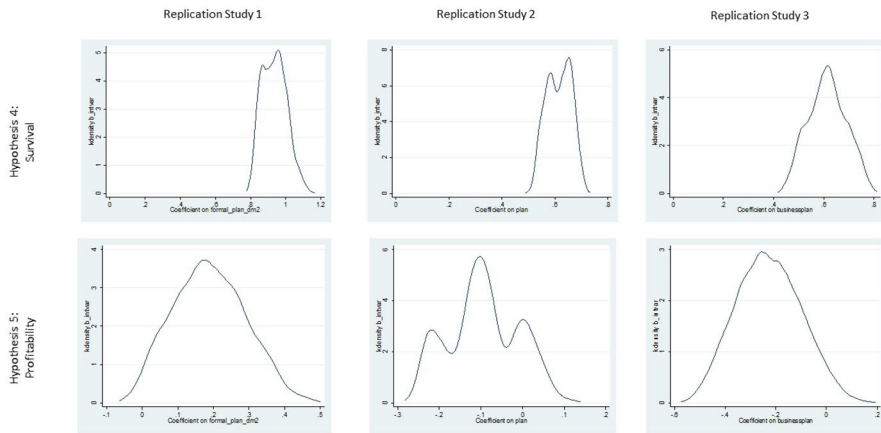
For the effect of a formal business plan on profitability, we find that the effect is never significant in any model combination estimated. These findings corroborate the evidence reported in the original study. We graph the modelling distribution for the performance measures in Fig. 2. The results corroborate the previous findings: the coefficient for formal planning on survival is strongly positive, and distributions appear to be similar across studies. Also, the coefficient for planning on profitability always includes zero, and, therefore, is not significant in all three replication studies. It is worth clarifying here that “survival” in this study indicates if the respondent is still actively attempting to start up a new business, more closely related to the notion of persistence. Therefore, it might be more accurate to call it persistence. “Survival” might suggest that there actually is a business that has been started and has survived.

### 3.4 Explanation for replication differences: theoretical and empirical mismatch

The original study of Honig and Karlsson theorizes an endogenous relationship between planning and outcomes. It specifically highlights the role of context in understanding why and when individuals plan and how this effects the outcome of the process. In fact, context theorizing suggests that governmental support agencies, industrial fields, and the founders’ business education all impact the likelihood of writing

**Table 5** Robustness of second stage estimates

Dep. variable: formal business plan	Exact replication	Corrigendum	Replication 1	Replication 2	Replication 3
Contact with assistance agency					
Mean	1.056	0.992	0.579	0.394	0.946
Robustness ratio	3.662	3.31	2.292	1.619	3.625
Sign stability (%)	100	100	100	100	100
Significance rate (%)	100	100	92	17	100
Manufacturing					
Mean	0.89	0.886	0.94	0.952	0.684
Robustness ratio	2.344	2.357	2.951	2.874	1.945
Sign stability (%)	100	100	100	100	100
Significance rate (%)	97	96	100	100	49
Business classes taken					
Mean	0.624	0.762	0.586	0.392	0.183
Robustness ratio	1.898	2.366	2.172	1.628	0.583
Sign stability (%)	100	100	100	100	87
Significance rate (%)	53	89	78	13	0



**Fig. 2** Modelling distribution formal planning on performance across replication studies

a business plan. As such, “situational opportunities and constraints [...] affect the occurrence and meaning of organizational behavior as well as functional relationships between variables” (Johns 2006: 386).

However, it has also been theorized and even reported explicitly that education, at least, affects the outcome variable (Davidsson and Honig 2003; Unger et al. 2011). Similarly, organizations that offer business advice and assistance have been reported to affect new venture outcomes (Davidsson and Honig 2003). Hence, several empirical concerns exist as to the role of institutional context in affecting the plan-performance relation.

The acknowledgment of agency on the one hand and external influences on the other hand yet highlights a disjuncture between theories and context that is apparent in nascent venture planning studies: the endogenous roots of the decision to plan are often conflated with the outcomes of planning, with the net result that there are biased estimates of the planning-performance relationship (Burke et al. 2010). With the notion of entrepreneurs choosing to plan based on external influences comes the problem that some entrepreneurs perceive business planning as a valuable strategy while others do not. More broadly speaking, under the conditions for one nascent entrepreneur business planning might be beneficial while under different circumstances not planning might be a preferable alternative. The business planning decision is thus likely to be endogenous and self-selected. Consequently, estimating performance impacts of strategic choices in entrepreneurial research by neglecting the endogenous nature of decisions might lead to erroneous results and could lead to wrong conclusions drawn from empirical analyses.

Given the way the institutional factors influence on the propensity to plan, it is likely that, at least, the second stage estimation, which looks into the effect of business planning on performance, is confounded by the specific institutional variables that affect planning and performance simultaneously. This may subsequently distort empirical estimates. In the original results reported, the variable indicating contact with a support agency influences both the likelihood of writing a business plan and

**Table 6** Matching estimators and formal planning effect on survival

Survival	Exact replication	Corrigendum	Replication 1	Replication 2	Replication 3
Propensity score	0.014	-0.024	0.113*	0.077 <sup>†</sup>	0.100 <sup>†</sup>
Nearest neighbor matching	0.046	0.08	0.117*	0.098 <sup>†</sup>	0.086
Radius matching	0.105	0.115 <sup>†</sup>	0.129*	0.109 <sup>†</sup>	0.104
Kernel matching	0.091	0.101 <sup>†</sup>	0.127*	0.108*	0.095

<sup>†</sup>  $p < 0.1$ \*  $p < 0.05$ \*\*  $p < 0.01$ \*\*\*  $p < 0.001$

the probability of persisting in the startup effort. Moreover, whether or not someone is a member of a business network influences planning, profitability, and survival. That is, the study may suffer from an endogeneity problem (predictor variables correlate with the error term in the outcome regression), making it difficult to assess the impact of context on planning propensity, and estimating the true causal effect of business planning on performance. We therefore aim in the following to extend the results along these lines to single out the effect of institutional factors on the decision to plan and to assess the robustness of the plan-performance relation (Burke et al. 2010; Greene and Hopp 2017).

To check the robustness of the estimates, all three groups performed this sensitivity check on the effect for formal planning on both survival and profitability. All studies estimated the impact of planning on performance using a propensity score matching approach (Li 2013; Kaiser and Malchow-Møller 2011). To rule out yet another potential source of biases, Li (2013) suggests it is reasonable to use other matching estimators to make sure that the matching choice is not affecting the results. All studies therefore provide estimates from nearest neighbor matching, kernel matching and radius matching alongside the PSM results.<sup>2</sup>

We report the results for the various versions of the endogeneity adjusted treatment effects for the survival outcome in Table 6. Interestingly, when it comes to the robustness of the findings, the original study shows no effect of business planning on survival, while the corrigendum reports an effect that is significant at the 10% level for radius and kernel matching. In addition, we find that within Replication Study 1, the coefficient for a formal business plan is positive and significant at the 5% level for all estimators employed. The coefficient estimates ranges from 0.11 to 0.13. In Replication Study 2, the coefficient is again positive and significant, yet significant at the 10% level in three out of four models, and once at the 5% level. Coefficients are slightly lower, ranging from 0.08 to 0.11. Lastly, in Replication Study 3, the coefficient is significant at the 10% level in only a single regression. The coefficients are comparable to the previous sets of regressions (from 0.09 to 0.1). All in all, there is yet again strong evidence that a formal plan affects survival positively.

Lastly, the results in Table 7 provide estimates of the various treatment effects for the profitability outcome. Here we find evidence that a formal business plan does not affect the profitability of a venture in neither the original study nor the corrigendum dataset. Also, in 12 matching models estimated, the coefficient for the formal business plan is significant and negative in a single estimator at the 10% level. This, however, is to be expected with 12 models estimated. In summary, the findings corroborate the insignificant effect of having a formal plan on venture profitability,

<sup>2</sup> In nearest neighbor, they compute the ATT using one single neighbor only. This provides a more conservative estimate; as more matching partners increase a potential bias (Abadie et al. 2004). In radius matching, controls are matched to treated units when the propensity score falls into a pre-defined range of the treated unit (Huber et al. 2015). Finally, to provide a non-parametric ATT, they use kernel matching, in which all treated units are matched with a weighted average of the controls, as per Becker and Ichino (2002).

Table 7 Matching estimators and formal planning effect on profitability

Profitability	Exact replication	Corrigendum	Replication 1	Replication 2	Replication 3
Propensity score	-0.055	-0.185**	-0.038	-0.06	-0.102 <sup>†</sup>
Nearest neighbor matching	0.023	0.057	0.063	-0.013	-0.048
Radius matching	0.016	0.049	-0.015	-0.031	-0.082
Kernel matching	0.03	0.031	0.003	-0.025	-0.053

<sup>†</sup>  $p < 0.1$   
\*  $p < 0.05$   
\*\*  $p < 0.01$   
\*\*\*  $p < 0.001$

## 4 Discussion

In our analysis, we replicate a paper published in the *Journal of Management* on institutional forces and the written business plan (Honig and Karlsson 2004) using the original dataset available to the researchers that conducted the initial study.

In sum, we find partial support only that the decision to plan is responsive to the need for external influences and, by implication, that plans are devices that seek to build institutional legitimacy for the nascent venture. There is mixed support for an institutional isomorphic perspective on planning, yet empirical results are not as robust as initially thought. The institutional theory variables proved to be less strongly related to business plans than presented in the initial study.

In particular, the education variable was more strongly related and the industry was strong in the replication. However coercion was somewhat surprisingly weak, probably as the operationalization of that, variable was more generic.

However, it is important to note that formal plans are not just ceremonial devices (Kirsch et al. 2009): once we have controlled for external finance in our selection model, we still find that planning has a positive impact on venture survival but no effect on profitability. We, therefore see value in developing an ‘endogeneity sensibility’ to discover context-free regularities (Tsui 2007). Interestingly, our replication studies found that the hypothesized effect of formal planning on nascent venture persistence is larger and more significant than reported in the original study. Yet, we note a disjoint between theories and empirics that becomes apparent. We believe that this gap persists because the prevailing nascent planning literature has failed to fully integrate the contextual nature of planning. This is not to say that prior planning studies fail to acknowledge context, more that the situational context “influence is often unrecognized or underappreciated” (Johns 2006: 389, emphasis in original). One implication of our approach is that researchers should integrate an endogeneity dimension in their attempts to describe, explain and guide managerial practice. Such an endogeneity perspective is important because it helps develop a more contextualized and processual view of entrepreneurial, managerial and organizational behaviors (Mackenzie 2000; Langley et al. 2013).

Our results are line with other large scale evidence that points to the efficacy of formal business planning (Burke et al. 2010; Delmar and Shane 2003). We see that there are positive reasons why scripted formal planning works. This includes a recognition that planning provides a framework for translating goals into actions that aid persistence. We find a strong (and robust) effect of business planning on nascent venture survival (but not profitability). Our findings therefore also have implications for the theoretical debate about the role business planning plays in new ventures.

On the contrary, we did not find evidence on formal plans affecting profitability, though severe variations existed as to how this variable was operationalized. This raises interesting questions for future research on goal setting theory and business planning. Whilst goal setting theorists have traditionally emphasized how ability and circumstance impact on goal attainment (such as profitability), what our research suggests is that there is a need for further theorizing on the temporality of goal setting. Goal setting appear to work for short term goals, such as achieving intermediate milestones and thus survival, but not for achieving profitability in the long run. Importantly, however,

the variable employed in Honig and Karlsson (2004) differs in some ways from other PSED type measures that focus on early-stage profitability, for example in the harmonized version of the PSED (Reynolds et al. 2016). These studies include salaries of the managers as part of their dependent variable and report lower percentages of ventures reporting profitability. An extension using harmonized data (and other countries) might therefore be warranted to generate more definitive conclusions.

While we find some agreement with the initial published paper's general findings, the replication also highlights very prominent concerns especially with respect to variable operationalization. The degrees of freedom associated with empirical research in management have been discussed in detail in Hitt et al. (1998), who discuss the measurement problem in strategic management research. In term of the operationalization of the institutional theory variables, we also find very little common ground between the original study and the replication efforts by the Ph.D. students (that used the explanations from the published study and the data from the original dataset). As such, the constructs used may not even be fit to measure the underlying theoretical construct, and, hence, there are concerns about whether researchers are actually measuring what they claim to be measuring (Ketchen et al. 2013). Quite frankly, without access to the original data and coding, being able to assess the accurateness of the claims raised in a study (not only in H&K) is virtually impossible. In this context, it proved impossible to reconcile and implement the same variables and estimators as in the original work, without access to original data, estimation files, and research documents. To this end, it is still surprising that researchers do not share data and code more frequently (Berghmans et al. 2017; Borgman 2012, 2015).

## 5 Conclusion

One of the best ways to reduce incidents of scholarly error, whether intentional or not, is systematic replication. Rather than viewing prominent articles in high-impact journals such as the *Journal of Management* (JOM) as sacred texts, contemporary scholars would be better served by careful attempts at replication, resulting in the verification or contradiction of important management research.

The present paper re-analyzes a study that was published in the JOM—"Institutional forces and the written business plan" (Honig and Karlsson 2004). Three separate teams re-do the empirical exercise and re-run the numbers. The findings highlight the importance of transparency—of making raw data freely available—and also of looking clearly at the fine-grained choices that researchers make when they process data. The data the original article is based on, has already been subject to considerable controversy, as discussed elsewhere (Honig and Samuelsson 2014, 2015; Davidsson 2015; Delmar 2015). Only through careful and unbiased re-examination of published data through rigorous replication procedures can scholars be certain that critical findings are trustworthy, and worthy of being heeded by the wider community.

Our study found that there was considerable variation in possible conclusions, depending on undisclosed statistical and scholarly decision making. Thus our study contributes additional information about the robustness of the Honig and Karlsson (2004) study, and shows the impact that minor statistical decisions can have on the

findings of a study. In fact, all researchers (including the original authors) made sensible and defensible assumptions about their data coding, though there seem to be too little robustness checks in the original study. To this end, the replications raise the question of whether the institutional variables accurately represent institutional influences on formal business planning.

In our view, there aren't enough exact replication studies. This shortage limits our understanding of the theoretical and empirical implications upon which future scholars can build. Scrutiny can only be exerted when data is available, and, hence, commonly owned, and when assumptions are defended and disputed. Subjectivity is a component of the research process; transparency can clarify choices and facilitate richer understanding of interpretations.

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## Appendix 1

Table 8.

**Table 8** Sources and questions for variable coding

Variable	Honig/Karlsson	Exact Replication	Replication 1	Replication 2	Replication 3
Survival	1 if the project survived horizon and zero if it was abandoned at any point	sg14in*, sg24in*	sa01yn*	sg14in*, sg24in*	sg14in*
Profitability	Profitable at any of the survey interviews (6-, 12-, 18-, or 24-month)	gi21in*	pp11in18/24; pp13in18/24	pp11in*, pp21in24; pp31in24	pp11in18/24; pp13in18/24
Formal business plan	Formally written plans for external use as having completed a business plan	gb03in00	gb03in*	gb03in00	gb03in00
Contact with assistance agency	Dummy of entrepreneurs indicated contact with a business support agency	cs01in00	cs02in*	cs02in*—cs08in*	cs01in00
Manufacturing	Dummy variables for industry by service, trading, manufacturing, and undeclared	sb14in*	sb14in12	sb14in*	sb14in12
Business classes taken	Nascent entrepreneur had completed a business class	gu01in00-12	gu01in06	gu01in00	gu01in*
Years education	Highest level of education completed; coded into number of years	be01in00	be01in00	be01in00	be01in00
Years experience as manager	Years of supervisory or managerial experience	bw12in00	bw12nn00	bw12nn00	bw12nn00

Table 8 continued

Variable	Honig/Karlsson	Exact Replication	Replication 1	Replication 2	Replication 3
Years work experience	Total years of full time paid work experience in any field	tc061n00	tc061n00	bw11nn00	bw11nn00
Previous start-up experience	Dummy indicating Individuals who had previously attempted a start-up	tc071n00	tc071n00	tc071n00	tc071n00
Parents in business	Either parent had ever owned a business before	br03in00	br03in00	br03in00	br03in00
Encouraged by friends or family	Received very strong or strong encouragement from family or friends to start a business	bs05in00	b1bn00	bs05in00	bs05in00
Close friends or neighbours in business	Many close friends or neighbors who owned their own businesses	bs02in00	bs02in00	bs02in00	bs02in00
Member of a start-up team	If and when the nascent entrepreneurs indicated they were a member of a start-up team	gt01in00-18	gt01in00	gt01in00	gt01in00
Member of business network	Gotten involved in any business networks (list provided). Affirmative responses	gn01in06-24	gn01in06	gn01in*	gn01in06
Knew customers before start-up	No definition provided in text	gt41in06-24	gt61in06	gt41in*	gt41in06

**Table 8** continued

Variable	Honig/Karlsson	Exact Replication	Replication 1	Replication 2	Replication 3
Age	Age of nascent entrepreneur	sx01nscr	tc121n00	sx01nscr	tc121n00
Gender	Gender of respondent	sx28iscr	tc111n00	sx28iscr	tc111n00
Married	Whether or not the entrepreneur is living with a spouse or partner	hg04in00	hg04in00	hg04in00	hg04in00
Children	Have children living in their home	hg02nn00	hg02nn00	hg02nn00	hg02nn00
Observations	396	396	379	390	339

\*All years of interviews

## Original question text for variables used in replication studies

### Survival:

- sa01yn\*: In what year did you give up?
- sg14in\*: How would you describe the current status of this start-up effort? Is it now an operating business; still in an active start-up phase; still a start-up, but inactive; no longer being worked on by anybody; or something else? 1 "Operating business", 2 "Active start-up", 3 "Inactive start-up", 4 "Abandoned by all", 5 "Run by someone else", 6 "Other, describe", – 1 "Don't know", – 9 "Refused", – 5 "N/A".
- sg24in\*: How would you describe the current status of this start-up effort? Is it now an operating business; still in an active start-up phase; still a start-up, but inactive; resting; no longer being worked on by anybody; or something else? 1 "Operating business", 2 "Active start-up", 3 "Inactive start-up", 4 "Abandoned by all", 5 "Run by someone else", 6 "Other, describe", – 1 "Don't know", – 9 "Refused", – 5 "N/A".

### Profitability:

- pp11in18/24: Did your company make a profit or loss previous year of operations? (Operational profit): 0 Breakeven, 1 Profit, 2 Loss, – 1 Don't know, – 9 Refused, – 5 "N/A".
- pp21in24: Did your company make a profit or loss in 1998? (Operational profit): 0 Breakeven, 1 Profit, 2 Loss, – 1 Don't know, – 9 Refused, – 5 "N/A".
- pp31in24: Did your company make a profit or loss in 1997? (Operational profit): 0 Breakeven, 1 Profit, 2 Loss, – 1 Don't know, – 9 Refused, – 5 "N/A".
- pp13in18/24: Do you expect your company to make a profit or a loss this year? (Operational profit): 0 Breakeven, 1 Profit, 2 Loss, – 1 Don't know, – 9 Refused, – 5 "N/A".

### Formal Business Plan:

- gb03in\*: What is the current form of the business plan. Is it unwritten (in your head), informally written, formally prepared, or something else?: 1 "Unwritten (in the head)", 2 "Informally written for internal use", 3 "Formally prepared for external use", 4 "Other", – 1 "Don't know", – 9 "Refused", – 5 "N/A".

### Contact with Assistance Agency:

cs02in\*: I will now ask you whether you have been in contact with certain organizations during your attempt to start up a company. If you have been in contact, I will also ask you whether you have had great, limited or no use of the contact.

- (a) Almi företagspartner (governmental agency for counseling and financing). (Have you been in touch with them? Have you had great, limited or no use of the contact?)

cs01in00: Many programs to help new businesses get established have been developed. Federal, state, and local governments, universities, and voluntary associations sponsor them. Have you made contact with any such program? 1 Yes, 2 No, 8 Don't know, 9 Refused.

cs02in\*–cs08in\*: I will now ask you whether you have been in contact with certain organizations during your attempt to start up a company. If you have been in contact, I will also ask you whether you have had great, limited or no use of the contact.

- (a) Almi företagspartner (governmental agency for counseling and financing). (Have you been in touch with them? Have you had great, limited or no use of the contact?)
- (b) Nyföretagarcentrum (Jobs and society). (Have you been in touch with them? Have you had great, limited or no use of the contact?)
- (c) NUTEKs startlinje (Telephone advice from the national board of technical development). (Have you been in touch with them? Have you had great, limited or no use of the contact?)
- (d) Arbetsförmedlingen (Unemployment agency). (Have you been in touch with them? Have you had great, limited or no use of the contact?)
- (e) Kommunal näringslivssekreterare (business advisor at the city/community administration). (Have you been in touch with them? Have you had great, limited or no use of the contact?)
- (f) Unga företagare (association for young entrepreneurs). (Have you been in touch with them? Have you had great, limited or no use of the contact?)
- (g) Support organization at university. (Have you been in touch with them? Have you had great, limited or no use of the contact?)
- (h) Have you been in contact with any other organization? (Have you been in touch with them? Have you had great, limited or no use of the contact?)

#### Manufacturing:

- sb14in\*: Is the company mainly a manufacturing company, a service company or a trading? 1 Manufacturing, 2 Service, 3 Trading, – 5 “N/A”, – 1 Don’t know, – 9 Refused.

#### Business Classes taken:

- gu01in\*: Have you taken any classes or workshops on starting a business?

#### Years Education:

- be01in00: What is the highest level of education you have completed so far?

#### Years Experience as Manager:

- bw12nn00: For how many years, if any, did you have managerial, supervisory, or administrative responsibilities?

#### Years Work Experience:

- tc061n00: (Years of work experience—respondent).
- bw11nn00: How many total years of full time, paid work experience in any field have you had?

#### Previous Start-Up Experience:

- tc07n00: (Number of previously started companies—respondent).

#### Parents in Business:

- br03in00: Did your parents ever work for themselves or run their own businesses, alone or together?

#### Encouraged by Friends or Family:

- b1bn00: Young people are encouraged to be independent and start their own businesses?; 1 Completely disagree, 2 Somewhat disagree, 3 Neither agree nor disagree, 4 Somewhat agree, 5 Completely agree.
- bs05in00: How would you describe the encouragement you received from family, relatives or other close friends, would you consider it very weak, weak, neither weak nor strong, strong, or very strong?; 1 Much, 2 Rather much, 3 A little, 4 No.

#### Close friends or neighbours in business:

- bs02in00: Among close friends and neighbors, did most, some, a few or none own their own business?; 1 MOST, 2 SOME, 3 A FEW, 4 NONE.

#### Member of a Start-Up team:

- gt01in00: Have you organized or helped to organize a start-up team?

#### Member of Business Network:

- gn01in\*: In order to help get this business going, have you gotten involved in any business networks, such as a trade association, chamber of commerce, or service club like the Lions or Rotary?

#### Knew customers before start-up:

- gi61in06: Do you know who will be your first customer(s)?
- gi41in\*: How did you get in touch with your first customers, did you know them before the start of the company, have you reached them through traditional marketing or in any other way? 1 “Knew them before start-up”, 2 “Marketing”, 4 “Other”.

#### Age:

- tc121n00: (Year of birth—respondent).
- sx01nscr: What year were you born?

#### Gender:

- tc111n00: (Gender—respondent).
- sx28isr: Gender.

#### Married:

- hg04in00: How would you describe your current marital status or living arrangement? 1 Single, 2 Living with a partner or married.

#### Children:

- hg02nn00 How many persons live in your household, including both children and adults? How many of these are children?

## Discrepancies between H&K dataset and Curated Swedish PSED file

### Survival:

- Coded as not having survived in H&K, actual outcome in parentheses.
- ID 30006 (run by someone else).
- ID 30375 (active start-up).
- ID 30385 (operating business).
- Coded as having survived in H&K, actual outcome in parentheses.
- ID 40531, 40554, 40558, 40582, 60095, 60213 (abandoned by all).

### Manufacturing:

- ID 30025 is coded as manufacturing though it indicates trading.
- ID 40336 coded as zero, though it first indicates manufacturing and in month 24 changes to trading, same for ID 40562 and ID 50174 that indicates manufacturing first and in month 24 services.
- ID 6021 and ID 70507 changes from manufacturing to trading in month 18.
- ID 40419 and ID 70515 is coded as zero, though they indicate manufacturing in month 12.
- Entry IDs 40590/60095/60116 coded as one, though they do not indicate an industry at all.

### Business Classes taken:

- ID 40356 40493 60095 60239 coded as one in H&K, though to indication of class taken.
- ID 40554 coded as zero, though class taken in month 6.
- ID 50175 coded as zero, though class taken in month 12.
- ID 30020 coded as zero, though class taken in month 18.

### Years Education:

- be01in00: What is the highest level of education you have completed so far?
- ID 30018 indicates grundskola in be01in00, but is coded as 15 years of education in H&K.

### Years Work Experience:

- ID 30018 indicates 23 years of work experience in bw11nn00 but only 3 years in H&K.

### Parents in Business:

- ID 40531 is coded as zero in H&K but indicates parents that owned a business.

#### Member of a Start-Up team:

- ID 30052 reports no other owners in gt01in00 yet is coded as 1 in H&K.

#### Member of Business Network:

- gn01in\*: In order to help get this business going, have you gotten involved in any business networks, such as a trade association, chamber of commerce, or service club like the Lions or Rotary?

- ID 30018 is coded as being in a business network, though the response is missing.
- ID 30038 and 50080 are coded as not being in a network, though they indicate in month 12 being in a network.
- ID 50175, 50360 and 50361 are coded as not being in a network, though they indicate in month 18 being in a network.
- ID 40354, 40356, 40531, 40590, 50154 are coded as 1 in H&K, though they never indicate being in a network.

#### Age:

- ID 30018 is coded as 30 in H&K, though he was born in 1958 resulting in an age of 42 based on the calculations employed in H&K.
- ID 40531 is coded as 30 in H&K, though it should be 29 to be consistent with other calculations.

#### Gender:

- ID 30018 and ID 40531 are coded as 0 in H&K though they indicate female in sx28isr.

#### Married:

- ID 30018 indicates living alone in hg04in00 but is coded as 1 in H&K

#### Children:

- ID 30018 coded as 1 in H&K though there are no children mentioned in hg02nn00.


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