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Keywords: management practices; learning; diffusion; business training

JEL classification: D22; D24; D83; M10; O33

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Who Wants to Improve their Management?

Evidence from A Failed Experiment

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Abstract

Structured management practices are robustly correlated with superior performance, but wide dispersion of management quality persists through time. This paper asks if management practices can bring about these improvements why do we see little change in the distribution of management practices over time? And if improvements to management practices within firms are possible and seemingly profitable over short periods, why is the uptake so low? We design three linked data collection tools to understand these puzzles showing that there is positive selection due to firms' management practices over time, their characteristics including share of management and educational level of management. These attributes along with subjective beliefs about barriers to improvement all contribute to firms' willingness to improve and take actions to do so. Our paper shows management practices are a predictor of firm survival and offers some policy interventions to help firms improve.

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1 Introduction

Professional management practices have widely been shown to correlate with positive outcomes such as higher survival, greater productivity, more innovation, and the ability to forecast the future more accurately (Bertrand and Schoar, 2003; Bloom et al., 2007, 2021). Much of this is causal: when management practices are varied experimentally (Bloom et al., 2013) or quasi-experimentally via institutional interventions such as WWII training programmes (Bianchi and Giorcelli, 2022) and the Marshall Plan (Giorcelli, 2019) with positive effects on profits, productivity and turnover growth that are statistically and economically significant. Recent literature by (Anderson and McKenzie, 2022; Bruhn and Piza, 2022; Iacovone et al., 2022; Anderson and McKenzie, 2021; McKenzie, 2021; Bruhn et al., 2018; McKenzie and Woodruff, 2014; Bloom et al., 2013) shows bespoke training by management consultants that increases firm performance by 5 to 10 percent.

Management practices also vary persistently and systematically across firms. Bloom and Van Reenen (2007)’s landmark paper shows that there are important differences across countries (US firms are on average better managed than European firms) and within countries (most countries and industries display a long tail of badly managed firms). Bloom and Van Reenen (2010) and Bloom et al. (2017) show these differences in management practices are associated at the country and firm level with performance differences.¹

In this paper we examine two puzzles: First, if management practices can bring about these improvements why do we see little change in the distribution of management practices over time? Second, if improvements to management practices within firms are possible and seemingly profitable over short periods of time, why is the uptake of opportunities to do so is low? ²

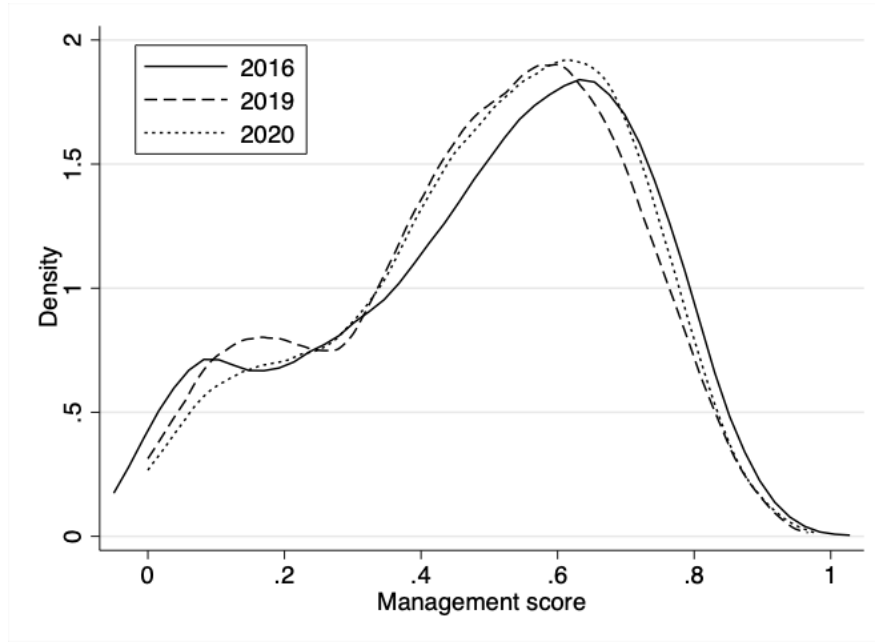
Consider Figure 1 which shows that a substantial number of firms do not improve, leading to a stable distribution of management practices over time. We show in this paper that it is related to the wider programme take-up problem noted in the business training literature.³

¹ONS (2021) provides additional detail for the UK. Much of the variation in management quality is present even within industries, regions and firm size bands.

²This reflects an insight in Bruhn et al. (2010) and Bruhn et al. (2018) that while missing managerial capital may hinder the growth of enterprises, the challenge is often to discover effective means to transfer management knowledge to firms. The large literature cited above does this by exploring the uptake of training, consultancy, free information, insourcing and outsourcing.

³Many other examples exist, for instance, in 2019, the Innovation Growth Lab at NESTA (Phipps and Fuller, 2022) reference a programme to encourage SMEs in London’s retail and hospitality sectors to adopt the use of new technologies. They report that only 43 out of 500 targeted businesses (8.6%) answered the final survey. Similarly, in 2021, the UK government has launched the Help to Grow programme, which provides training to help SME business leaders to increase productivity, seize investment opportunities and grow their business. Less than 10% of target enrolled (BeTheBusiness, 2023).

Figure 1: Overall management practices in 2016, 2019 and 2020

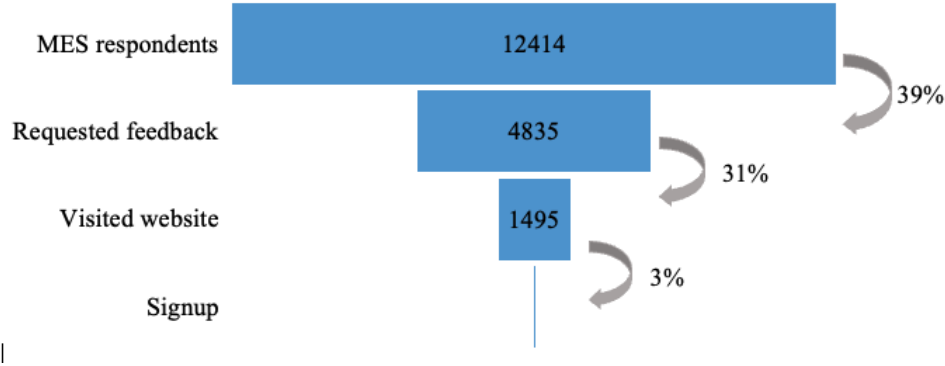


To examine this further we designed and implemented a management practices improvement programme to take firms on a journey offering free information and mentoring. Firms were invited to take part in a voluntary management practices survey, they could request their management score with feedback, they could visit a website with free information about their performance and could sign up for free mentoring. We are able to explore in greater detail the take-up at different stages in the journey.

Figure 2 shows the outcome in the form of a leaky pipeline: very few firms follow the journey to the end point by signing up on the management mentoring programme, even though it is offered for free. At every stage of the process we observe that a high proportion of firms declined our offer to improve their management. Out of 12,414 respondents to the survey, details of which are given below, just 39% requested feedback on their management score. Only 31% of those firms visited the website providing the information and just 3% of those ultimately signed up for the free mentoring programme offered by the UK government-sponsored body *Be The Business*. The last section of this pipeline towards improvement is the leakiest of all.

But take-up is not just low, it is also highly selective. As Figure 3 shows, firms with most to gain i.e. those with low management scores in aggregate, Panel (a), and similarly when broken out by size, industry and location, Panels (b)-(d), are least interested in acquiring the information to improve. Already strong performers show more interest in learning, for example, by requesting feedback. In a

Figure 2: Mentoring scheme: the leaky pipeline



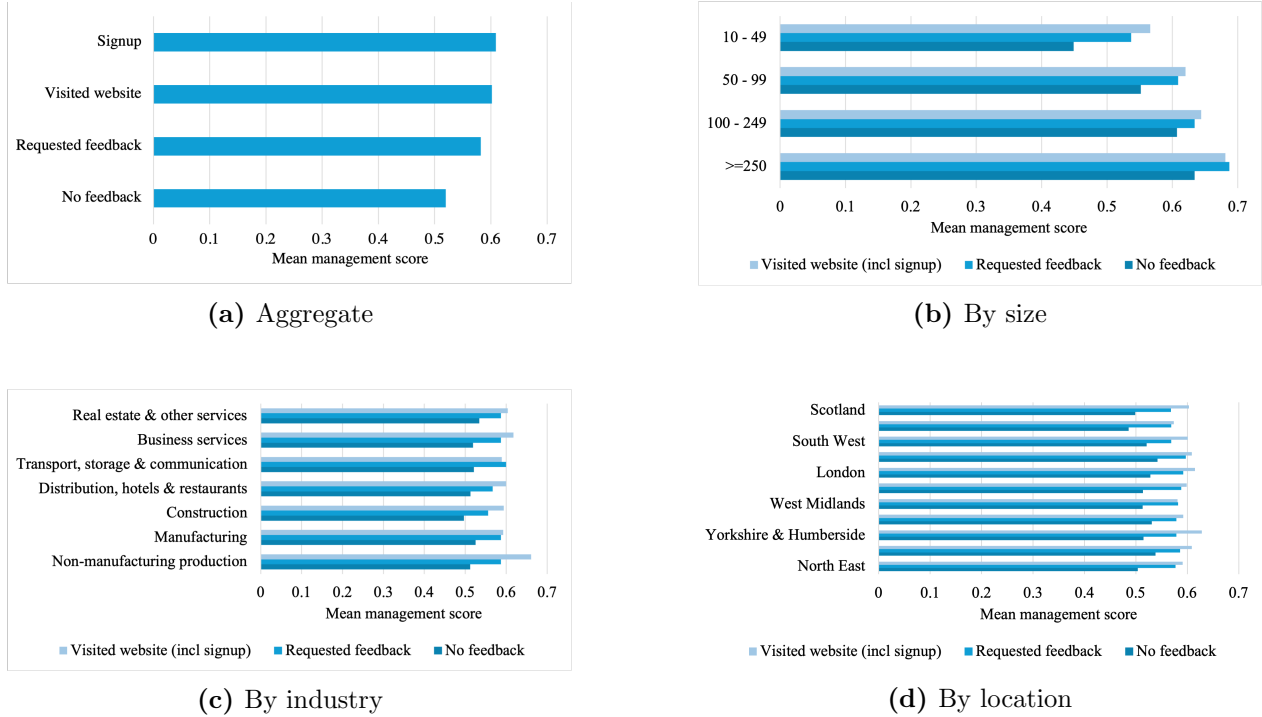
twist of fate, that feedback was not passed on to firms due to a clerical error, so we can identify that it is a firm's intention to improve rather than any information received through feedback that is responsible for subsequent management improvements. This suggests that a firm's *lack of intention* to improve can be a significant barrier to actual improvement, complementing earlier work on more diverse types of barriers in [Bloom et al. \(2012\)](#), World Bank Enterprise Surveys and [Fischer and Karlan \(2015\)](#), linking these to management practices and quality.

The novel contributions in this paper stem from our ability to explore the reasons for low uptake at every stage which in turn depends on three newly designed complementary data collection tools linked to the Annual Purchases Survey. First, together with the UK Office for National Statistics (ONS), we designed the Management and Expectations Survey (MES). The MES is part of the wider global family of management surveys spawned by the work of [Bloom et al. \(2007\)](#) and collects standardised management practices data for over 9,000 British firms in 2016 and 12,000 British firms in 2019 and 2020. We designed the survey to track the same firms across waves. For roughly 2,500 of these firms, we are able to link responses across waves (MES2016 and MES2020), allowing longer comparisons through time *within the same firm*.

Second, in partnership with a publicly-funded business training organisation, we offered all sampled firms feedback on their relative performance, and for those that showed interest, the opportunity to participate in a free management mentoring programme. The mentoring programme ultimately failed due to low numbers; but we observe firms throughout the journey to sign-up, allowing us to understand *which* firms are interested in improving their management and the stage where firms lose interest.

Finally, we designed a new module on the UK's new Business Insights and Conditions Survey

Figure 3: Mean management score at successive stages of the pipeline



(BICS). The BICS elicits qualitative information on firm expectations and beliefs. Prompted by the behaviour of firms in the mentoring scheme, we used the module to elicit firms' own *subjective beliefs* about their management practices and any barriers to improvement they face. Designing all three tools allows us to link across the three at the firm level to understand intentions, actions and outcomes jointly.⁴

We link these data to the Annual Purchases Survey which collects firm-level expenditure on management consultancy services. The Annual Purchases Survey (APS) is part of the regular ONS business surveys and is sent to approximately 33,000 businesses annually. It aims to collect information about business' expenditure on intermediate goods and services including energy used by the businesses and it includes among other variables business services such as consultancy.

This paper makes three contributions: first, we harness the large longitudinal MES dataset of 9,683 firms responding to MES2016 and 12,414 firms responding in MES2020 to provide new detail on who has improved their management practices, and who has not. We show that there is persistent dispersion in management practices that does not disappear over time, which explains

⁴Both surveys were administered by the UK Office for National Statistics (ONS). The Management and Expectations Survey (MES) was sent to 50,000 UK businesses at the end of 2020 and the Business Insights and Conditions Survey (BICS) is a twice-monthly survey of 50,000 UK businesses started in 2020.

the first puzzle why we see little change in management practices distributions over time. Even within the same industry and region, and controlling for observable firm characteristics, there is significant variation in management quality. Nevertheless, a significant fraction of firms improves from reference year to reference year.

Second, we shed much more light on who wants to improve based on actions of 12,414 MES respondents - signaled by various steps taken to deliver management improvements which we documented earlier. Each of these is significantly correlated with actual improvements that firms make subsequently in their objective management score. We also show evidence of strong positive selection throughout the pipeline designed to channel firms to a free management mentoring programme. The better a firm's management practices, the further it goes to find out more about potential management improvements. Despite many of these actions being virtually costless, very few firms complete all steps necessary to receive the free mentoring. This explains the second puzzle, since low uptake is a phenomenon linked to certain types of firms, often with low management scores to begin with, as well as a lower share of management and management with a college degree. But not all firms have low uptake. A firm's management consulting expenditure recorded in the UK Annual Purchases Survey is positively and significantly related to subsequent management improvements supporting evidence in [Ardanaz-Badia et al.](#). We reveal many indicators of positive intent that lead to firms seeking and making improvements to management practices.

Finally, we ask about barriers to management improvement from linked MES-BICS data. These questions focus on barriers to improvement of management practices specifically.⁵ These subjective assessments help us document that some firms identify major barriers in lack of time or resources but others do not engage or reveal a positive attitude to improvement, for example 53 % of firms claim that they face 'no barriers' but take no action to to improve either. These are more likely to be selected by firms with lower management scores. Potentially, this reveals firms either have a worrying lack of awareness of poor management that explains the persistence in dispersion of management practices or they have too little time to identify their barriers to improvement for management, let alone to implement them. From this information we infer the range of policy options that might encourage more firms to take up management improvements ranging from the passive to more active measures linked to other government support.

Our paper therefore contributes to several active strands of the literature. First, it complements

⁵While the sample is only 10 % of the size of the full MES sample, the firms in the linked sample have similar characteristics.

the large and growing number of papers on the role of management in firm performance (Bloom et al., 2007; Bloom and Van Reenen, 2010; Bloom et al., 2014; Li et al., 2023) by highlighting both the potential for rapid improvement, but adding more information about the contribution management makes to incentivise firms to improve and the underlying barriers to improvement, including cognitive and time constraints, that keep firms from adopting better management despite the many advantages.

Second, it sheds new light on a hidden characteristic of a long tail of low-productivity firms, which a large literature has documented (Andrews et al., 2016; Adalet McGowan et al., 2018; Berlingieri et al., 2017), namely how willing they are to improve in one important dimension, management quality. We show at successive stages there is an unwillingness or inability to adopt more structured management practices which is a contributory factor behind laggard firm outcomes.

Third, it supports the value of business training and management practices referenced in literature above. It is well known that when information or training is accepted, take up is low or temporary, Bruhn and Piza (2022).⁶ We show that take up is selective as well as low and temporary, and conditional on many firm characteristics.

Fourth, it shows that perceived barriers to innovation and adoption are reasons why there is low diffusion of best practices between frontier firms and others. This has been identified as a crucial source of static and dynamic inefficiency in developing and developed economies alike.⁷

Finally, this paper provides both better measures of the accumulation of management capital and knowledge transfer. While intangible capital more widely is an important contributor to positive firm outcomes (Crespi et al., 2007; Goodridge et al., 2016), management capital is perhaps the least well measured type of intangible capital (Black and Lynch, 2005; Ludewig and Sadowski, 2009; Squicciarini and Le Mouel, 2012).

This paper proceeds as follows. Section 2 describes the data sources. Section 3 outlines our results revealing within-firm improvements to management practices 2016-2020, feedback requests and other measures taken to improve, barriers to improvement and evidence on firm survival and management. Section 4 concludes.

⁶In a design that matches ours, the authors undertake a study of 866 small and medium-sized Brazilian firms, providing different versions of an information sheet that compared management practices of similar firms and proposed five ways to improve these practices. Our paper differs from theirs in that we explore the take-up of management improvement options on offer rather than the use information provided, but the conclusions are similar.

⁷In-class training for SMEs (Cole et al., 2009; Karlan and Valdivia, 2011) lead to improvements in business practices but less so business performance; subsidy of consultants makes large Indian textile firms aware of management practices (Bloom et al., 2013) and also improves practices for much smaller Mexican firms, (Bruhn et al., 2018) but not all firms could afford to take up consultancy even at subsidized rates.

2 Data

We draw on four data sources: three UK business surveys, conducted by the UK Office for National Statistics (Management and Expectations Survey, the Annual Purchases Survey, and the Business Insights and Condition Survey) and visitor data from a custom-built website.

2.1 The Management and Expectations Survey

The MES collects information on the use of structured management practices across four categories - continuous improvement, or how businesses respond to problems; the use of key performance indicators (KPIs); the use of targets; and employment practices relating to promotion, training and employee underperformance. A first wave (MES2016) was dispatched as a paper questionnaire in the summer of 2017 and collected information about the 2016 reference year. A second wave (MES2020) was sent out as an electronic questionnaire in the autumn of 2020 and collected information for the 2019 and 2020 reference years.

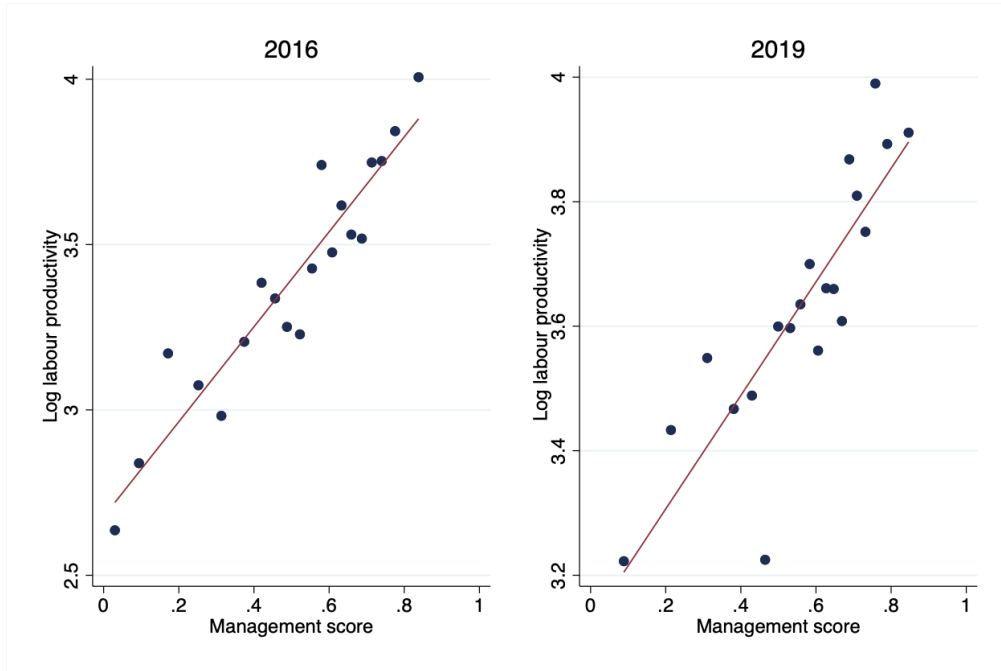
Both waves were sent to businesses in the market sector, excluding agriculture and finance, trading in Great Britain with 10 or more employees. The survey collected data on firms' management practices, expectations, business characteristics (such as ownership structure, input use and turnover), as well as wider organisational practices.

MES2016 was sent to about 25,000 businesses, garnering roughly 8,000 responses (a response rate of 39%). MES2020 was sent to roughly 50,000 businesses, garnering 12,000 responses (a response rate of roughly 24%).

In line with previous research ([Bloom and Van Reenen, 2007](#)), we calculate an overall management practices score for each firm by averaging scores from four categories described above. The overall management practices score is a continuous variable that falls between zero and one. A score of one indicates a firm has adopted the most structured management practices in all four areas; a score of zero denotes a firm that has failed to adopt even the most basic management practices.

This survey shows that management practices and firm productivity performance are positively correlated in the UK (see [Figure 4](#)). These results match findings from the Management and Organisational Practices Surveys conducted in 13 countries ([Bloom and Van Reenen, 2007](#)).

Figure 4: Management practices and business performance in Great Britain (GVA per worker) are positively correlated.



2.2 The Annual Purchases Survey

The Annual Purchases Survey feeds into the UK National Accounts and among other variables collects firm-level expenditure on management consultancy services.⁸ In a typical year, roughly 80% of surveyed firms, or 25,000 firms, answer the APS questionnaire. The linked MES2020-APS sample we use for analysis contains 2,775 firms.

Following [Ardanaz-Badia et al.](#), we use information on expenditure on consulting services as an indicator of firm motivation to improve which we hypothesise may drive management score changes. Because expenditure on consultancy services is not very frequent, we construct a dummy that takes the value 1 if a business spends any amount on consulting services in any available years between MES2016 and MES2020 (that is, in reference years 2016, 2017 or 2018), and 0 otherwise.

⁸The Annual Purchases Survey (APS) is part of the regular ONS business surveys and is sent to approximately 33,000 businesses annually. It aims to collect information about business' expenditure on energy, services, goods, and materials that are used up by the business activity, including raw materials, power and fuel, rental on buildings, and business services such as advertising and recruitment consultancy. It specifically excludes fixed assets or capital investment, wages, and goods and services bought for resale without further processing. For further details, please see [ONS \(2019\)](#).

2.3 The Business Insights and Conditions Survey

The Business Insights and Conditions Survey (BICS) is a fortnightly voluntary ONS business survey aiming to gather qualitative, rapid-response data on topical issues impacting UK businesses. Each wave of BICS is sent to approximately 50,000 businesses. A typical wave garners roughly 12,000 responses (a response rate of 24%). We were able to place two questions on management learning on BICS survey wave 64. The first question asked respondents what steps their business had taken over the last year to improve their management practices. The second asked respondents to name the largest barrier to management improvement their business faced over the last year. Both questions also provided a text box to capture answers not anticipated when designing the questions. When linking BICS wave 64 with MES2020, we obtain a linked sample of 1,237 firms. The Appendix contains more information about BICS wave 64.

2.4 Be The Business mentoring website data

From a carefully designed collaboration with a UK government funded mentoring scheme (*Be the Business*) we offered firms information on their own management practices score from MES2020, additional information about the importance of management practices and the offer of free mentoring. All respondents of MES2020 were offered the opportunity to receive additional feedback about their management practices across the different categories, compared to respondents in the same industry and region.⁹ We tracked the visitor data to obtain information about which firms access the website, how much time they spend on different areas of the website and whether they decide to sign up to a free management mentoring programme; we then linked this to MES2020 using a key that translates the unique access code into a standard ONS reporting unit references.

2.5 Summary Statistics

Table 1 presents the summary statistics for firms in the MES2016, MES2020 and the linked sample containing both. Overall there is evidence of little change in management score through time, since the level of the score was 0.57 in 2016 and 0.55 in 2020, which is well within one standard deviation

⁹Respondents were asked *Would you like to receive [Firm name]’s management practices score?*” (See Figure B.1), those who opted to receive feedback had a unique access code and the URL of a purpose-built, standalone website. The website provided visualisation of the management practices score of that particular business versus the distribution and mean of scores in the industry (See Figure B.2). A ”Sign up for Free Mentoring” banner was added on that web page. When respondents clicked on that banner, they would see a description about the training program as well as an application form (See Figure ??).

Table 1: Summary Statistics

	A. MES 2016			B. MES 2020			C. Linked sample		
	Mean	SD	Count	Mean	SD	Count	Mean	SD	Count
Management score 2016	0.57	0.21	9677	-	-	-	0.58	0.19	2694
Management score 2019	-	-	-	0.53	0.20	12413	0.56	0.19	2694
Management score 2020	-	-	-	0.55	0.20	12413	0.57	0.19	2694
Employment	242	971	9677	139	462	12413	196	504	2694
Family owned	0.57	0.50	9629	0.65	0.48	12413	0.61	0.49	2694
Foreign owned	0.11	0.31	9677	0.11	0.32	12413	0.14	0.34	2694
Share of managers in total workforce	0.17	0.16	9210	0.17	0.12	12168	0.16	0.10	2685
Share of managers with a college degree	0.38	0.35	9326	0.37	0.35	12412	0.39	0.34	2694
Age: 5 years or younger	0.08	0.27	9564	0.07	0.26	12413	0.01	0.10	2694
Age: 6-10 years	0.11	0.31	9564	0.12	0.32	12413	0.08	0.28	2694
Age: 11-15 years	0.11	0.31	9564	0.12	0.33	12413	0.11	0.31	2694
Age: 16-20 years	0.11	0.31	9564	0.13	0.33	12413	0.13	0.33	2694
Age: 21+	0.59	0.49	9564	0.56	0.50	12413	0.67	0.47	2694
Multiple sites	0.48	0.50	9677	0.42	0.49	12413	0.49	0.50	2694

and therefore not significantly different. This confirms our observation about the static average values also observed in Figure 1. To avoid the sample selection bias, we also show the scores in the linked sample which give scores of 0.58 in 2016 and 0.57 in 2020. In MES 2016 sample, the mean firm size is 242 employees, much higher than 139 in the MES 2020 sample. But the medians are closer, i.e. 56 and 49 employees respectively.¹⁰ The average firm age in 2016 sample is 16.60 years, while that in 2020 sample it is comparatively older at 19.10 years.

3 Results

Our main results provide evidence from one of the largest longitudinal surveys of management practices on the changes that take place through time and the payoff to seeking improvement. We ask who wants to improve, documenting the firms that did or did not ask for feedback, visit the website for more information, sign up for free mentoring, or take other steps such as spend resources on consulting services or make improvements to their management practices. Then we explore who has improved, documenting the changes in management scores and the determinants including requested feedback and used consulting services. A transition matrix shows how firms have moved between quintiles. We then look at the change in 2019-2020 and finally, we ask what barriers were there to improvement, and what does this reveal about the difficulty policymakers face in persuading firms to make improvements.

¹⁰The weighted means are also closer, i.e. 60 and 49 employees respectively, as is shown in the Appendix Table A.1.

3.1 Who Wants to Improve?

We estimate the desire to improve using OLS regressions that explain which firms were asking for feedback, visiting the website for more information and signing up for free mentoring, or spending resources on consulting services or make improvements to their management practices

$$Y_i = \alpha + \beta M_i + \rho X_i + \sigma_i + \tau_i + \epsilon_i, \quad (1)$$

where Y_i is an indicator variable (binary variable) whether a firm requested feedback or not according to the MES, visited the website or not, observed spend on consulting services 2016-2018 from the ABS taking a similar approach to [Ardanaz-Badia et al.](#) or taken measures to make improvements or not according to the BICS. M_i indicates the recent management score of firm i , X_i are control variables of characteristics such as age, size, family owned and managed, not family owned, σ_i and τ_i denotes industry and regional fixed effects, and ϵ_i is a stochastic residual.

In Table 2 we report the results from OLS regressions of Equation (1) which reveal some stylised facts about who wants to improve using a wide range of sources (three surveys and a dedicated website). Columns (1) -(2) show the firms that request feedback, column (3) shows who visited the website to view the management score and receive information about it, column (4) shows who paid for consulting services 2016-2019 and column (5) shows who has taken actions according to the BICS survey. First, firms with higher management practices scores are more likely to want to improve. The coefficients on the management score 2019 are positive and significant. The magnitudes of the coefficients are particularly large for requesting feedback and taking actions, but they have positive coefficients for all other measures as well. Second, the type of firm affects the probability of wanting to improve. Family owned firms and foreign firms are less likely to want to request feedback in 2020 or visit the website for more information. Family owned and run firms were less likely to use consulting services 2016-19. Older firms were more likely to request feedback in 2020 but not in 2017. Third, firms with a higher share of managers in the workforce or a higher share with a degree were more likely to ask for feedback, visit the website for more information and sign up for free mentoring, or spend resources on consulting services. Therefore, a high overall management score is the key predictor for firms' effort or commitment that they are prepared to make to improve management practices, supplemented by being having a higher share of managers and more managers with a college degree.

Table 2: Who wants to improve?

	(1)	(2)	(3)	(4)	(5)
	Requested feedback 2017	Requested feedback 2020	Visited website	Used consulting	Taken actions
Management score	0.555*** (0.027)	0.446*** (0.024)	0.158*** (0.016)	0.114** (0.050)	0.738*** (0.077)
Family owned but not managed	0.002 (0.018)	-0.034*** (0.013)	-0.024*** (0.009)	-0.033 (0.026)	-0.018 (0.036)
Family owned and managed	0.010 (0.013)	0.013 (0.012)	-0.003 (0.008)	-0.041** (0.021)	-0.015 (0.033)
Foreign owned	-0.020 (0.019)	-0.039** (0.016)	-0.039*** (0.010)	0.018 (0.025)	-0.048 (0.037)
Age: 6-10 years	-0.035 (0.024)	0.008 (0.021)	-0.006 (0.014)	-0.012 (0.043)	-0.089 (0.072)
Age: 11-15 years	-0.025 (0.024)	-0.002 (0.021)	0.004 (0.014)	-0.002 (0.042)	0.044 (0.066)
Age: 16-20 years	-0.029 (0.024)	0.009 (0.021)	0.003 (0.015)	-0.034 (0.042)	-0.062 (0.068)
Age: 21+	0.012 (0.020)	0.039** (0.019)	0.009 (0.013)	-0.050 (0.036)	-0.017 (0.060)
Share of manag	0.085** (0.039)	0.103*** (0.038)	0.054** (0.025)	0.168** (0.070)	0.061 (0.159)
Share of manag degree	0.022 (0.017)	0.082*** (0.015)	0.058*** (0.010)	0.061** (0.029)	0.032 (0.049)
Industry FE	Yes	Yes	Yes	Yes	Yes
Size FE	Yes	Yes	Yes	Yes	Yes
Location FE	Yes	Yes	Yes	Yes	Yes
Multiple sites	Yes	Yes	Yes	Yes	Yes
Observations	8574	12134	12134	3222	1522
R2	0.065	0.052	0.028	0.140	0.131

Notes: Control variables for Columns (1) and (4) are in year 2016. Control variables for columns (2), (3), and (5) are in year 2019. Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

3.2 Within-firm Changes to Management Practices

We look next at the factors that are correlated with within-firm changes to management practices from 2016 to 2019 to test the hypothesis that firms that requested feedback or used consulting services in previous years had greater improvement in management.

Table 3: Who has improved? Score change 2016 - 2019

	(1)	(2)	(3)	(4)	(5)
Management score	-0.486*** (0.021)	-0.491*** (0.021)	-0.524*** (0.038)	-0.524*** (0.038)	-0.537*** (0.039)
Family owned but not managed	0.007 (0.010)	0.005 (0.010)	0.018 (0.013)	0.018 (0.013)	0.022* (0.013)
Family owned and managed	-0.005 (0.007)	-0.006 (0.007)	-0.006 (0.012)	-0.006 (0.012)	-0.003 (0.012)
Foreign owned	0.013 (0.010)	0.012 (0.010)	0.013 (0.014)	0.015 (0.014)	0.017 (0.014)
Age: 6-10 years	0.008 (0.018)	0.008 (0.018)	-0.008 (0.038)	-0.009 (0.038)	-0.009 (0.037)
Age: 11-15 years	-0.001 (0.018)	-0.002 (0.018)	-0.021 (0.035)	-0.021 (0.035)	-0.019 (0.034)
Age: 16-20 years	-0.030* (0.018)	-0.032* (0.018)	-0.042 (0.038)	-0.042 (0.038)	-0.043 (0.037)
Age: 21+	-0.033** (0.016)	-0.035** (0.016)	-0.019 (0.034)	-0.020 (0.034)	-0.022 (0.033)
Share of manag	0.060** (0.029)	0.059** (0.029)	0.112** (0.049)	0.118** (0.049)	0.113** (0.049)
Share of manag degree	0.022** (0.010)	0.021** (0.010)	0.030* (0.017)	0.031* (0.017)	0.033* (0.017)
Requested feedback		0.015*** (0.006)	0.004 (0.010)	0.004 (0.010)	
Using consulting in 2016 - 2018			0.018* (0.010)		0.014 (0.010)
Industry FE	Yes	Yes	Yes	Yes	Yes
Size FE	Yes	Yes	Yes	Yes	Yes
Location FE	Yes	Yes	Yes	Yes	Yes
Multiple sites	Yes	Yes	Yes	Yes	Yes
Observations	2551	2487	925	925	950
R2	0.280	0.282	0.343	0.341	0.344

Note: The dependent variable is the management score change from 2016 to 2019. Control variables are in year 2016. Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Equation 2 gives the specification to test the hypothesis.

$$M_{i,t} - M_{i,t-1} = \alpha + \beta Request_{i,t-1} + \gamma M_{i,t-1} + \rho X_{i,t-1} + \sigma_i + \tau_i + \epsilon_{i,t}, \quad (2)$$

where $M_{i,t}$ indicates the management score of firm i in year t , $Request_{i,t-1}$ is a dummy that equals to one if firm i has requested to receive feedback in year $t - 1$, $X_{i,t-1}$ are firm-specific and time-varying control variables, σ_i and τ_i denotes industry and regional fixed effects, and $\epsilon_{i,t}$ is a stochastic residual.

In Table 3, we document the types of firms that have improved their management practice from 2016 to 2019, estimating Equation (2) via OLS. In column (1), we regress the management

Table 4: Transition matrix 2016 - 2019

		Management quintiles 2019					Total
		1	2	3	4	5	
Management quintiles 2016	1	104	56	35	12	16	223
		46.64	25.11	15.70	5.38	7.17	100.00
	2	64	90	103	60	37	354
		18.08	25.42	29.10	16.95	10.45	100.00
	3	39	88	134	146	90	497
		7.85	17.71	26.96	29.38	18.11	100.00
	4	19	47	132	207	240	645
		2.95	7.290	20.47	32.09	37.21	100.00
	5	10	26	82	195	495	808
		1.24	3.22	10.15	24.13	61.26	100.00
Total		236	307	486	620	878	2,527
		9.34	12.15	19.23	24.54	34.74	100.00
		Management quintiles 2020					Total
		1	2	3	4	5	
Management quintiles 2019	1	1,334	197	36	31	16	1,614
		82.65	12.21	2.23	1.92	0.99	100.00
	2	230	1,206	330	80	32	1,878
		12.25	64.22	17.57	4.26	1.70	100.00
	3	52	438	1,403	447	112	2,452
		2.12	17.86	57.22	18.23	4.57	100.00
	4	31	82	585	1,720	499	2,917
		1.06	2.81	20.05	58.96	17.11	100.00
	5	16	32	75	617	2,812	3,552
		0.45	0.90	2.11	17.37	79.17	100.00
Total		1,663	1,955	2,429	2,895	3,471	12,413
		13.40	15.75	19.57	23.32	27.96	100.00

Note: This table shows one-year and three-year transition matrices illustrating movement between quintiles of the management score quintiles calculated from weighted MES. The number of firms is shown at the top, while the percentage of transitions is displayed below. Transition probabilities are not weighted.

score change from 2016 to 2019 on overall management score in 2016, with industry and location fixed effects. This shows that there is substantial mean reversion in management scores, but as we add further regressors in later columns we see who has improved their management score. In column (2), we include an indicator variable which equals one if the firm has requested to receive feedback about their management in MES 2016 and zero otherwise. This variable reflects firm's motivation to know more about management and make improvements. The statistically significant positive coefficient shows the intention to improve has an impact on actual change in management practices over a three year period, accounting for an increase of 7.5% of the standard deviation of the average score in 2019. Due to a clerical error, firms that requested feedback never actually received any. Therefore, any positive effect on subsequent management practices estimated here is due to the intent to find out rather than the information content in the feedback. In other words, it is a selection effect rather than a treatment effect. In column (3) we register whether a firm

Table 5: Who has improved? Score change 2019 - 2020

	(1)	(2)	(3)	(4)
Management score	-0.107*** (0.005)	-0.112*** (0.005)	-0.112*** (0.005)	-0.109*** (0.005)
Family owned but not managed	-0.001 (0.002)	-0.000 (0.002)	-0.000 (0.002)	-0.001 (0.002)
Family owned and managed	-0.000 (0.002)	-0.000 (0.002)	-0.000 (0.002)	-0.000 (0.002)
Foreign owned	0.005* (0.003)	0.006** (0.003)	0.006** (0.003)	0.006** (0.003)
Age: 6-10 years	-0.009** (0.004)	-0.009** (0.004)	-0.009** (0.004)	-0.009** (0.004)
Age: 11-15 years	-0.008* (0.004)	-0.008* (0.004)	-0.008* (0.004)	-0.008* (0.004)
Age: 16-20 years	-0.017*** (0.004)	-0.017*** (0.004)	-0.017*** (0.004)	-0.017*** (0.004)
Age: 21+	-0.016*** (0.004)	-0.017*** (0.004)	-0.017*** (0.004)	-0.016*** (0.004)
Share of manag	0.001 (0.008)	0.000 (0.008)	0.000 (0.008)	0.001 (0.008)
Share of manag degree	0.008*** (0.003)	0.007*** (0.003)	0.007*** (0.003)	0.008*** (0.003)
Requested feedback		0.011*** (0.002)	0.010*** (0.002)	
Visited website			0.004 (0.003)	0.010*** (0.002)
Industry FE	Yes	Yes	Yes	Yes
Size FE	Yes	Yes	Yes	Yes
Location FE	Yes	Yes	Yes	Yes
Multiple sites	Yes	Yes	Yes	Yes
Observations	12167	12134	12134	12134
R2	0.093	0.096	0.096	0.094

Note: The dependent variable is the management score change from 2019 to 2020. Control variables are in year 2019. Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

paid for consulting services in the period 2016-18 (after the data collected by MES2016 but prior to MES2020). We find that this also has a positive effect on the score, which is slightly larger increase of 9% of the standard deviation of the average score in 2019. In columns (1-5) we control for firm characteristics (including the logarithm of employment), family ownership and foreign ownership and age. We find that larger firms are significantly more likely to improve their management score, but not those firms that are family owned and run. Age has a negative and significant effect, suggesting that all else equal older firms do not improve their management scores. We also include in all specifications the share of managers in the workforce and the share of managers holding a college degree qualification. This allows for the quantity and quality of management, and both

contribute positively to the management score change, over and above the size, age or ownership structure of the firm. The conclusion we draw from these findings is that we observe behaviour that is very consistent with a leaky pipeline and selection at each stage.

We now turn to Table 4 to explore the patterns in the transition matrix for the three year period 2016-2019 and the one year period 2019-2020. We see that despite the apparently static distributions illustrated in 1 there is movement between quintiles and this is not restricted to the firms in the upper quintiles. This is important because it shows that there is movement between quintiles that is not apparent in the static distributions in Figure 1. Although the bottom quintile is a stickier state than others, it is not much stickier.

In Table 5 we then repeat the earlier exercise to explore the determinants of the change in management score for a shorter window between 2019 and 2020 using MES 2020. The value of reviewing this table is that this period covers the onset of Covid-19. Coefficients for the management score variable are the same sign but smaller in magnitude (adjusting for the 1-year window length here compared with 3-year length in Table 3). Firm characteristics have some similarities, since older firm size is associated with a lower score change and foreign owned firms have a higher score, which is significantly different from zero in 5. The share of managers is not significant but the share with a college degree has a positive coefficient indicating a similar influence that raises management score. The effect of requesting feedback remain statistically significant and positive, as does visiting the website when included individually. We conclude that despite challenging conditions under Covid-19 the relationships with our explanatory variables are robust — larger, younger firms with higher shares of managers with better qualifications tended to improve their management scores.

In the following subsection we will explore reasons why firms may differ in willingness to improve.

3.3 Barriers to Management Learning

Firms may want to adopt good management practices, but face many and varied constraints. There has been evidence in Bloom et al. (2012), Fischer and Karlan (2015), and World Bank Enterprise Survey (WBES) that human resource management, financial, sales and marketing, government etc are barriers to growth and better performance. But firms also face quite specific management constraints that leave them lacking time and resources to learn about ways to improve the quality of their management practices. These latter types of barriers have not been explored in depth, so we introduce targeted questions to the BICS survey, which we explore in this subsection.

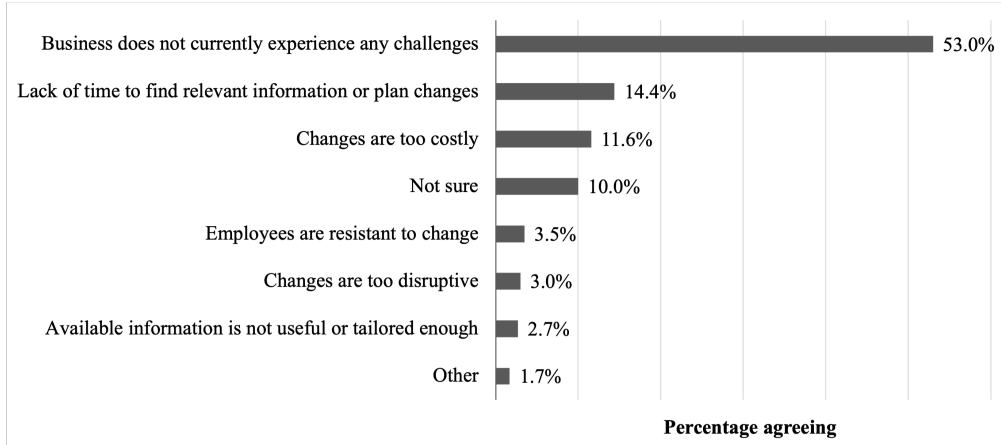
We first explore non-response, and find that firms with lower management scores are significantly

less likely to respond to the survey. According to columns (1 - 2) of Table 6, decreasing the management practices score of a firm by 0.1 percent (roughly equivalent to moving a firm from the upper quartile to the median) decreases the likelihood of response by three percentage points, or roughly 12% of the average response rate of 25%. This non-response effect is highly statistically significant and stable across specifications that allow for requested feedback or not.

Among those 6,702 firms who responded to BICS64 we show the most common responses in Figure 5 is that the firm is currently not experiencing any challenges. Many firms identify a lack of resources (12%) or lack of time (15%) but more than half of the firms reported that they did not experience any challenges. At face value this is a worrying observation, which implies more than half of firms cannot identify management problems that need to be addressed. If true, then policymakers will not be able to persuade these firms that they need to address shortcomings in their management practices and uptake for improvement schemes will be low from this segment of firms. Any improvement in average management practices scores and the related performance of firms, is only likely to occur if there is reallocation of capital and labour from poorly performing firms to better performing firms. This Darwinian process may take time, and may be stalled by financial measures that support weak firms.

There is another interpretation of these results, that is less pessimistic. Firms that cannot identify their own shortcomings in management practices, may be extremely short of time and resources. Since improvement to management practices, hiring larger numbers of better quality managers, insourcing or outsourcing all take time and resources, these may be the poorly performing firms and the firms that have too little time and resources to identify let alone solve their management problems. If this is the case, then policymakers may need to help improve average management practices scores by identifying common management practice problems and offering relatively low cost solutions rather than leaving the poor performers to wither. Alongside these measures to show firms where improvements can take place, and create incentives for firms to look for further improvements, firms may be given other support measures conditional on them seeking improvements to management through feedback, comparisons with peers and mentoring by firms with higher management practices scores. In the next section we explore firm survival and management before returning to the policy implications.

Figure 5: The main challenge for improving management practices according to BICS64 (weighted)



3.4 Firm Survival and Management

A logical question to ask at this point is ‘Why does this matter?’ One answer, drawing on the widespread evidence in (Bloom et al., 2007, 2021) is that poor management practices are correlated with poor performance across the board, affecting profits, productivity and turnover growth. But if those firms are more likely to wither and die, then this may not be a concern for the medium term. In this section we explore the survival of firms, by asking Are badly managed firms more likely to fail than better managed firms?

We use data drawn from the UK Inter-Departmental Business Register (IDBR) database to define firm survival and exit. The IDBR captures administrative data on sales taxes (Value Added Tax (VAT)) and employee income taxes (Pay As You Earn (PAYE)) which are linked to registered businesses at the tax authorities. These are a comprehensive list of UK businesses. We match MES 2016 with the IDBR from 2017 to 2020. We define a firm exiting the market when it is absent from the IDBR for one year and all the following years. To illustrate, if a firm appears in the IDBR for 2017 and 2018, but not for 2019 and 2020, it is considered as having exited in 2019 with a duration of three years. Therefore, the duration can range from one to five years.

Out of the 9683 firms in MES 2016, 995 exited the market by the end of 2020: of which 117 died in 2017, 301 died in 2018, 298 died in 2019, and 279 died in 2020. Appendix A.2 presents the descriptive statistics for failed firms and surviving firms separately.

Observing the data in Figure 6 we see the incidence rates, calculating as the number of failures relative to the total number of observations on the vertical axis plotted against management deciles on the horizontal axis. There is a negative correlation between incidence and management score for

Table 6: Barriers to Management Learning

	(1)	(2)
Management score	-0.308*** -(0.069)	-0.278*** (0.070)
Family owned but not managed	-0.021 -(0.03)	-0.019 (0.030)
Family owned and managed	-0.034 -(0.028)	-0.031 (0.028)
Foreign owned	0.016 -(0.031)	0.016 (0.031)
Age: 6-10 years	-0.005 -(0.058)	-0.012 (0.058)
Age: 11-15 years	-0.014 -(0.055)	-0.021 (0.056)
Age: 16-20 years	-0.023 -(0.055)	-0.027 (0.055)
Age: 21+	-0.029 -(0.049)	-0.035 (0.049)
Share of manag	0.254** -(0.128)	0.265** (0.128)
Share of manag degree	0.031 -(0.04)	0.033 (0.040)
Requested feedback	-0.060*** (0.021)	-0.095*** (0.028)
Industry FE	Yes	Yes
Size FE	Yes	Yes
Location FE	Yes	Yes
Multiple sites	Yes	Yes
Observations	1527	1520
R2	0.073	0.078

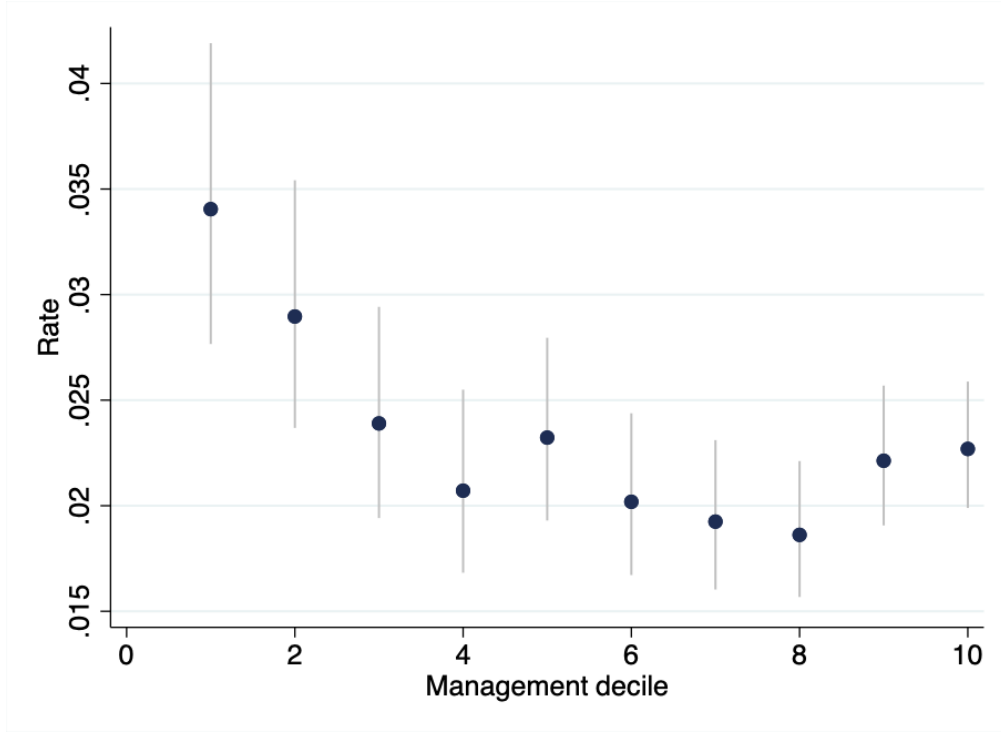
Note: For columns (1) and (2), the dependent variable is a dummy variable which equals one if a firm responded to BICS wave 64 but did not answer the barrier question, and zero otherwise. Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

the first to sixth deciles, with the effect being most prominent for the first three deciles. Three of the four top deciles show no statistically significant difference in incidence compared with the sixth decile. This shows us that badly-managed firms have a higher incidence of failure.

To model this, we follow previous research on firm survival and exits, making use of a Cox proportional hazard model to empirically evaluate how management practices affect firms' survival. The hazard function $h(t)$ is specified as in Equation 3.

$$h(t) = h_0(t)(e)^{X\beta}, \quad (3)$$

Figure 6: Incidence rates by management deciles



where $h(t)$ is the rate at which firms exit at time t given that they have survived in $t - 1$, h_0 is the baseline hazard function (the parametric form that is not specified) when all of the covariates equal zero, and X is a vector of firm characteristics.

The results of estimating the hazard model are presented in the Table 7. Column (1) presents the baseline model where only management score is included. The coefficient has a negative and significant coefficient, which means that firms with a higher management score have a lower likelihood of exiting. This negative relationship persists in column (2) although it is significant only at the 10% level due to the importance of industry, size, location and multiple sites among firm characteristics. Column (2) also allows for time fixed effects on the exit rate. Column (3) then introduces ownership and age into the equation, showing that foreign owned firms are more likely to exit but family owned and run firms are less likely to do so. The older the firm the less likely it is to exit. A higher share of managers with a college degree has a similar effect of reducing the likelihood of exit. Finally, column (4) add in the share of managers, which is insignificant, but otherwise the results are similar to before.¹¹ From our analysis we conclude that the impact of management

¹¹As a robustness check, we also used the complementary log-log (cloglog) model, which is considered more appropriate for discrete time survival analysis. The results are presented in Table A.3. The conclusions above still hold.

score on the likelihood of exiting is robust, negative and significant but while worse-managed firms are more likely to exit, the difference in survival rates is not enough to guarantee full convergence, some policy measures will also be needed to improve performance.

Table 7: Firm survival and management score

	(1)	(2)	(3)	(4)
Management score	-0.526***	-0.304*	-0.422**	-0.221
	-0.133	(0.156)	(0.169)	(0.182)
Family owned but not managed			-0.116	-0.145
			(0.103)	(0.108)
Family owned and managed			-0.199***	-0.198**
			(0.074)	(0.077)
Foreign owned			0.237**	0.207*
			(0.108)	(0.113)
Age: 6-10 years			-0.349***	-0.307***
			(0.109)	(0.116)
Age: 11-15 years			-0.756***	-0.708***
			(0.120)	(0.126)
Age: 16-20 years			-0.631***	-0.587***
			(0.118)	(0.125)
Age: 21+			-0.924***	-0.867***
			(0.095)	(0.101)
Share of manag degree			-0.212**	-0.181*
			(0.101)	(0.106)
Share of manag				-0.224
				(0.225)
Industry FE	No	Yes	Yes	Yes
Size FE	No	Yes	Yes	Yes
Location FE	No	Yes	Yes	Yes
Multiple sites	No	Yes	Yes	Yes
Observations	9677	9677	9171	8825
Log likelihood	-11144.362	-11036.335	-10002.701	-9208.645

Note: All estimates were obtained using a proportional hazard model. Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

3.5 Policy Interventions

What if anything can policymakers do to improve management practices on average in these circumstances? A quasi-Darwinian conclusion, which follows from the previous section, is for policymakers to recognize that firms that are poorly managed will eventually fail, and the worst managed firms are more likely to fail. By allowing reallocation of resources from poorly managed firms towards better managed firms the average performance will rise. The difficulty with this approach is that it is entirely passive, and even if there is a higher likelihood of failure it may take a long time to

achieve an improvement in average management performance. Furthermore, it may not work if the government or the private sector provides rescue schemes or support measures through other routes, for instance ever-greening loans.

A more positive approach might be to recognise that some firms have little time and resources to identify management barriers and others have time to identify them but not enough resources to solve them. A recent study by [Phipps and Fuller \(2022\)](#) at the UK Innovation Growth Lab indicated that barriers to improvement start with lack of information and awareness, but persuasion leads progressively to a decision to adopt and implement, which in turn makes firms more likely to be open to other improvements. Therefore policy makers could seek out ways to reduce information gaps and persuade firms to take steps to address common problems experienced by similar firms to help the firm recognize problems and potential solutions which might be low cost or even subsidized innovations. [Adem et al. \(2023\)](#) took a low cost intervention to provide businesses website performance versus a peer group, and benchmarks for improvement, which led to better website performance within a month. [Bruhn and Piza \(2022\)](#) encouraged SMEs in Brazil to adopt consulting services to improve their management, seeking to simplify the steps to adoption. By contrast, when [Burchell and Wallis \(2021\)](#) offered SMEs in the Greater London Authority with vouchers to subsidise the adoption of basic artificial intelligence methods to improve their websites, none were taken up. The application process was too complicated compared with the perceived benefits. We conclude that the key is to make the information salient and short and ensure the process is low cost to implement. This may help address the problem of scope, where a firm is limited by a small set of decision makers with limited time and cognitive capacity compared to others with a larger managerial structure, and addresses the quantity and quality of management that we identified as an explanation for low responses to offers of improvement.

[Anderson and McKenzie \(2022\)](#) experimented with the effectiveness of different types of support - training, consulting, insourcing or outsourcing expertise - for SMEs in the areas of finance, marketing and sales in a randomized control trial. They discovered that market provided support was more impactful than training and more cost effective than consulting. This suggests the mode of support is a significant factor in persuading a firm to improve. Several World Bank sponsored studies of external interventions have proven effective in developing countries [Bruhn et al. \(2018\)](#), [Apedo-Amah et al. \(2020\)](#) while other studies in advanced economies find similar results ([Adams et al., 2016](#)). Visits from mentors show mixed results. [Brooks et al. \(2018\)](#) followed mentoring relationships with entrepreneurs in Kenya, where the mentoring improved performance initially but

the improvement disappeared after the relationship ended, while [Dalton et al. \(2021\)](#) show best practices information supplemented by a visit to apply the information, greater improvement was observed. Our study suggest that those firms that paid for consulting services made improvements in management practices in subsequent years compared to those that did not.

It may be the case that behavioural factors are also important. [Wu and Broughton \(2019\)](#) from the UK Behavioural Insights Team noted that low adoption of proven management practices and technology are linked to mistaken assessment of costs or benefits, over-weighting of risks (loss aversion), a poor mentality towards growth or improvement, or overconfidence. Our own study echos these findings among the barriers to improvement, such as 'resistance to change', 'change is too costly', 'change is too disruptive' and especially the view that 'the business does not currently experience any challenges'. By taking a more proactive approach that makes other forms of support conditional on firms accepting advice or mentoring to improve its management practices may nudge the firms towards improvement overcoming the barriers to change. These could be justified on the basis that there is little point offering support of other kinds to firms that are not well managed or that have spurned feasible improvements. Variations on this theme may involve tax incentives for adopting firms, supply side reforms to encourage the provision of better practices or the setting of industry standards.

4 Conclusions

A growing literature finds evidence that good management practices are associated with better outcomes for firms: higher productivity, turnover, survival, innovation and better forecasting ([Bloom et al., 2007](#); [Bloom and Van Reenen, 2010](#); [Bloom et al., 2014, 2021](#)). Much of this effect seems to be causal ([Bloom et al., 2013](#); [Giorcelli, 2019](#)). Yet the dispersion of management scores remains. What is more, firms claim that they face few barriers to improvement but leave relatively costless improvements unaddressed. Together, these facts present two puzzles: First, if management practices can bring about these improvements why do we see little change in the distribution of management practices over time? Second, if improvements to management practices within firms are possible and seemingly profitable over short periods of time, why is the uptake so low?

In this paper we have brought together microdata from three novel sources that establish three main contributions to address these puzzles. First, we show that there is persistent dispersion in management practices that does not disappear over time, which explains the first puzzle why we see

little change in management practices distributions over time. Second, a significant fraction of firms improves from reference year to reference year and firms positive select into receiving feedback, and into each stage of a process designed to guide firms into a free management programme. The better a firm's management practices, the further it goes to find out more about potential management improvements. Despite many of these actions being virtually costless, very few firms complete all steps necessary to receive the free mentoring, but some do. Third, when asked about their investments in management learning and any barriers they face firms identify major barriers in lack of time or resources but others do not engage or else reveal no challenges exist despite having low management scores. For example 53 % of firms claim that they face 'no barriers' but take no action to to improve either. Finally, while worse-managed firms are more likely to exit, the difference in survival rates is not enough to guarantee full convergence.

Together, these novel facts suggest that firms with more structured management are more inclined to improve, and more ready to seek ways to do so. There is positive selection into improvement programmes. Firms are also aware of significant barriers to improvement and survival is affected by quality of management. Our paper concludes with some tentative suggestions for the improvement of policy interventions, by providing information in simple, salient and low-cost ways, supporting the implementation with market provided support packages, and overcoming behavioral factors with conditional support packages, industry standards or tax incentives.

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A Figures and tables

Table A.1: Summary Statistics (weighted)

	A. MES 2016		B. MES 2020	
	Mean	SD	Mean	SD
Management score 2016	0.49	0.23	-	-
Management score 2019	-	-	0.48	0.21
Management score 2020	-	-	0.49	0.21
Employment	60	396	49	236
Family owned	0.67	0.47	0.73	0.45
Foreign owned	0.04	0.2	0.06	0.24
Share of managers in total workforce	0.19	0.16	0.19	0.14
Share of managers with a college degree	0.34	0.38	0.36	0.38
Age: 5 years or younger	0.13	0.34	0.13	0.33
Age: 6-10 years	0.16	0.36	0.15	0.35
Age: 11-15 years	0.15	0.35	0.15	0.36
Age: 16-20 years	0.12	0.32	0.14	0.35
Age: 21+	0.45	0.50	0.43	0.50
Multiple sites	0.30	0.46	0.28	0.45

Table A.2: Summary statistics for survived and failed firms

	Survived firms			Failed firms		
	Mean	SD	Count	Mean	SD	Count
Management score	0.58	0.20	7799	0.56	0.21	1035
Employment	211	589	7799	237	1343	1035
Family owned	0.57	0.49	7799	0.57	0.50	1035
Foreign owned	0.11	0.31	7799	0.11	0.32	1035
Share of managers in total workforce	0.17	0.14	7799	0.17	0.15	1035
Share of managers with a college degree	0.39	0.35	7799	0.38	0.36	1035
Age: 5 years or younger	0.07	0.25	7799	0.14	0.35	1035
Age: 6-10 years	0.1	0.3	7799	0.15	0.36	1035
Age: 11-15 years	0.11	0.32	7799	0.11	0.32	1035
Age: 16-20 years	0.11	0.31	7799	0.12	0.32	1035
Age: 21+	0.61	0.49	7799	0.47	0.5	1035
Multiple sites	0.48	0.5	7799	0.48	0.5	1035

Table A.3: Firm survival and management: complementary log-log model

	(1)	(2)	(3)	(4)
Management score	-0.538*** (0.133)	-0.308** (0.157)	-0.428** (0.169)	-0.218 (0.182)
Family owned but not managed			-0.120 (0.103)	-0.150 (0.108)
Family owned and managed			-0.200*** (0.074)	-0.199*** (0.077)
Foreign owned			0.240** (0.108)	0.209* (0.113)
Age: 6-10 years			-0.359*** (0.109)	-0.315*** (0.116)
Age: 11-15 years			-0.772*** (0.120)	-0.722*** (0.126)
Age: 16-20 years			-0.645*** (0.118)	-0.599*** (0.125)
Age: 21+			-0.946*** (0.095)	-0.886*** (0.101)
Share of manag degree			-0.220** (0.101)	-0.187* (0.106)
Share of manag				-0.236 (0.225)
Industry FE	No	Yes	Yes	Yes
Size FE	No	Yes	Yes	Yes
Location FE	No	Yes	Yes	Yes
Multiple sites	No	Yes	Yes	Yes
Observations	54645	54645	51914	50106
Log likelihood	-5844.360	-5730.777	-5236.634	-4887.613

Note: Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

B Website Contents

Figure B.1: Feedback request question in MES2020

4. Feedback and Comments

This section provides the opportunity to request feedback on the management practices score and provide any additional information that will help us understand the answers you have provided.

Would you like to receive [Ru Name]'s management practices score?

To show our appreciation for taking part in this survey, ONS would like to provide your business with its own "management practices" score based on the information you have provided.

- Yes, I would like to receive feedback
- No, I would prefer not to receive feedback

Figure B.2: Feedback on the web page

