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A Comparison of International Childcare Systems

Research report

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Executive Summary

This report by the Centre for Research in Early Childhood (CREC) builds on and extends work already completed for the Economist Intelligence Unit (EIU) on international comparisons between centre-based preschool provision in 45 countries:

www.lienfoundation.org/pdf/publications/sw_report.pdf

and also uses the PISA (Programme for International Student Assessment) 2009 school outcomes data. This study aimed to:

1. provide a short contextual commentary for 15 selected study countries plus the UK on changes in the 5 structural indicators of their early education system over the last 5 years and also on the child physical wellbeing data for each country;
2. analyse patterns within, and between, the set of 5 structural indicators in centre-based **preschool provision** across the 15 selected study countries, plus the UK;
3. explore any associations of these structural indicators with later educational outcomes for children, looking at 'top performing', 'above average' and 'average' performing countries, as defined through the most recent PISA rankings data (2009)

The structural indicators which form the basis of this study of 15 countries plus the UK are:

Indicator 1: staff: child ratios

Indicator 2: staff training and qualifications

Indicator 3: regulation and data collection

Indicator 4: government strategy and investment

Indicator 5: national preschool curriculum requirements

A methodology statement of how the EIU scores for each of the qualitative indicators were calculated can be found in Appendix 2. It should be noted that the data used in this report is not able to be statistically analysed to establish correlations between structural indicators and school performance. Its strength lies in its capacity to describe how both European and non-European countries are responding to demands for a more highly structured, professionalised and regulated early education system which has the capacity to address socio-economic disadvantage, provide strong economic returns on investment and create more inclusive, stable and higher achieving societies. The data in this report begins to map out possible associations and patterns in how these structural mechanisms are working and makes some tentative analysis of differences between high and average performing countries, as measured by the PISA 2009 assessments.

Analysis of the patterns and associations between the indicators and the PISA school outcome results reveal:

1. European countries consistently show:

- Higher staff: child ratios (i.e. Higher number of staff to number of children)
- Relatively higher levels of training and qualifications
- Higher levels of regulation
- More national curriculum guidelines for preschool
- Stronger government strategy and investment in preschools

Non-European countries often have a very different pattern to European countries and we can see in all the non-European countries in the study:

- Lower staff: child ratios (i.e. Lower number of staff to number of children)
- Relatively lower levels of training and qualifications
- Lower levels of regulation
- Relatively less national curriculum guidelines for preschool
- Lower government involvement in strategy and investment in preschools

2. The current pattern of response to each structural indicator in all the non-European study countries (and many European countries) should be viewed as dynamic and fluid. There is evidence to show that countries are converging in their systemic approach, with the non-European countries in this review putting in place reforms to match levels of structural quality with the best in European countries.^{1 2 3 4 5}

3. High performing European countries in terms of school outcomes appear to have:

- Higher staff: child ratios (higher number of staff to number of children) than other European countries
- higher levels of staff qualification and training
- relatively higher levels of regulation than other European countries
- middle to high range response to the existence of a Government-led strategy and the level of investment

¹ Carnegie Corporation of New York and The Sutton Trust (2012) *The Social Mobility Summit: Report of the Summit held at the Royal Society London 21-22 May 2012*

² Carnegie Corporation of New York and The Sutton Trust (2008) *Social Mobility and Education: Academic Papers presented at a high level summit sponsored by the Carnegie Corporation of New York and the Sutton Trust, 1-3 May 2008.*

³ OECD (2012) *Starting Strong III - A Quality Toolbox for Early Childhood Education and Care*

⁴ Economist Intelligence Unit (2012), *Starting Well: Benchmarking early years education across the world*

⁵ Pascal, Bertram et al (2012), *The Impact of Early Education as a Strategy in Countering Socio-economic Disadvantage: A report for Ofsted*

4. The UK is either performing at the same level or higher than the other countries in the study on the structural indicators but more poorly in terms of its PISA rankings. It should, however, be noted that the links with later school performance and these structural outcomes are hard to tease out because of the time lag in the data. The UK has gone through a rapid period of system development over the last 10 years and its impact on later outcomes would not be evident in the current outcomes data.
5. More research is needed, using child outcomes evidence recorded on exit from preschool, which can show more definitively the impact of changes to the structural indicators on school outcomes.

1. Introduction

On 19 June 2012 the Prime Minister announced a commission on childcare to look at how to reduce the costs of childcare for working families and burdens on childcare providers. The commission has said that it will draw on the knowledge and views of a wide range of experts in the field, together with international evidence on high-quality, affordable childcare.

The Centre for Research in Early Childhood has been commissioned by the Department for Education to undertake a review of comparative international data to identify patterns and associations between different structural and systemic preschool approaches and later educational outcomes.

The impact of early education as a strategy in enhancing children's educational outcomes and countering socio-economic disadvantage has been well documented in the research literature. Recent evidence⁶ reveals that the potential of the system to make a difference to children's lives is fundamentally affected by certain key systemic and structural aspects of early education provision. Yet, at present the way that these structural elements impact on the longer term educational achievement of children is not well understood. Further work is clearly needed which explores what structural aspects of early education operate to improve educational outcomes for all children, and particularly, the disadvantaged. How far do early years' systems in different countries adopt these successful strategies? What systemic and structural aspects of early education require more supporting evidence? Is there any evidence on the impact of changing any of these structural aspects e.g. staff: child ratios?

This paper:

- Examines how 15 OECD countries plus the UK have responded to the challenge of implementing a set of structural mechanisms within their early education systems and how far these can be seen to be related to enhanced educational attainment for children.
- Sets out recommendations for action and further innovation.

This report by CREC builds on and extends work already completed by CREC for the Economist Intelligence Unit (EIU) on international comparisons between centre-based preschool provision in 45 countries www.lienfoundation.org/pdf/publications/sw_report.pdf (N.B. Home-based provision e.g. Childminding was not included in this data).

The EIU Study was commissioned in 2012 by the Lien Foundation in order to assess the extent to which OECD and major emerging market countries provide *“a good, inclusive early childhood education (ECE) environment for children between the ages of three and six. In particular, it considers the relative availability, affordability and quality of such preschool environments.”*⁷ The

⁶ Pascal C, Bertram A et al (2012), *The Impact of Early Education as a Strategy in Countering Socio-economic Disadvantage: A report for Ofsted*

⁷ Economist Intelligence Unit (2012), *Starting Well: Benchmarking early years education across the world* p6

overarching thrust of this study was to analyse and benchmark the quality and inclusiveness of the EC system in 45 countries using a set of agreed structural and systemic indicators.

It should be noted that the EIU study did not concern itself specifically with educational outcomes, or child performance data, which might be seen as a limitation of the study. However, the strength of its data lies in its primary focus on a country's performance with regard to embedding those EC system characteristics. Research has revealed the importance of these in achieving a well educated, inclusive and equitable society which provides opportunities for all its members to succeed, especially its less advantaged. This study was based on the belief that the quality and inclusiveness of the EC system was possibly a more helpful way of comparing countries, and offered a sharper indication of how well a system might be functioning in relation to best system practice. In this way it is quite different from other ranking or benchmarking systems like PISA, which largely focus on educational outcomes data to determine country ranking positions.

Another recent review conducted by the authors⁸ provides convincing evidence of the validity of the 5 structural indicators used in this cross national review (and others). Robust research has shown that these 5 indicators appear to be associated with enhanced educational outcomes, particularly for the less advantaged. The review also highlights the fact that these indicators are key levers within an early education system for reducing inequality, educational underachievement and social exclusion. The indicators explored cross nationally in this study are:

Indicator 1: staff: child ratios

Indicator 2: staff training and qualifications

Indicator 3: regulation and data collection

Indicator 4: government strategy and investment

Indicator 5: national preschool curriculum requirements

A summary of the supportive evidence for each of the 5 structural indicators is provided in Appendix 1.

⁸ Pascal, Bertram et al (2012), *The Impact of Early Education as a Strategy in Countering Socio-economic Disadvantage: A report for Ofsted*

2. Methodology

2.1 Country Sample

From an initial list of 21 countries identified and covered by the EIU report, in conjunction with the DfE, 15 plus the UK have been chosen to be the focus of this study. The 15 countries plus the UK are:

European:

	Rep Ireland
Belgium	Spain
Czech Republic	Sweden
Denmark	
Finland	
France	
Germany	
Netherlands	
Norway	

Non-European:

Australia
Canada
Singapore
China

2.2 Data Sets

Two sets of data were used in this report to analyse and interrogate the early education system performance in these target countries.

2.2.1 School Outcomes Data

The first data set we used was the *Program for International Student Assessment (PISA)* which is a system of international assessments that focuses on 15-year-olds' capabilities in reading literacy, mathematics, and science. PISA also includes measures of general or cross-curricular competencies such as problem solving. PISA emphasizes functional skills that students have acquired as they near the end of compulsory schooling. PISA is co-ordinated by the Organization for Economic Cooperation and Development (OECD), an intergovernmental organization of industrialized countries. Begun in 2000, PISA is administered every 3 years. Each administration includes assessments of all three subjects, but assesses one of the subjects in depth. The most recent administration was in 2009 and focused on reading literacy. The PISA 2009 frameworks are available at <http://www.oecd.org/pisa/pisaproducts/44455820.pdf>. To date, over 70 countries and economies have participated in PISA, so it offers a rich and comprehensive

data set of school outcomes in a wide range of countries, providing a useful tool to inform policy making.

PISA ranking data were chosen ahead of other available international educational performance data for several reasons:

- Date of publication – collated in 2009 this data is more current than the most recent TIMMS (*Trends in International Mathematics and Science Study*) (2007) and PIRLS (*Progress in International Reading Literacy Study*) (2006) data;
- Coverage – All countries in the study group participated in the most recent PISA rankings exercise as opposed to the most recent TIMMS and PIRLS rankings;
- Scope of data – PISA aims to evaluate education systems worldwide every three years by assessing 15-year-olds' competencies in the key subjects of reading, mathematics and science, rather than in just one subject area.

It should be noted however that there are important limitations and issues relating to the use of the PISA rankings in this report. Critically, the PISA rankings are based on assessments undertaken in 2008 when children were 15 years old. There is, therefore, a time gap between the child's preschool experience in the mid 1990's and their assessment as a measure of current system performance. During this period, the early education system in all countries will have gone through some measure of innovation and change, which in some cases was significant and radical, as will be shown later in the report. Also, in some countries the aims of their early education systems are far broader than the development of a relatively narrow set of educational outcomes at 15 years of age and so these wider outcomes may not be captured through the PISA assessments. These limitations in the data source must be noted when looking at patterns and trends in this report as the impact of the early childhood contextual changes on school/system performance are yet to work through the data.

Noting these limitations, in this study the PISA data was used to organise the 15 chosen countries plus the UK into 3 groups ('top performing', 'above average' and 'average') according to their most recent performances on the PISA rankings (2009, 3 yearly test for 15 year olds (65 countries in sample)). The results of this grouping of countries by PISA rankings are as follows:

Figure 1 Study countries grouped by performance in PISA (2009) rankings.

	Country	PISA ranking (2009)
Top performing	China	1
	Finland	3
	Singapore	5
	Canada	6
	Australia	9
	Netherlands	10
	Belgium	11
	Norway	12
Above average performance	Germany	19
	Sweden	20
	France	21
	Republic of Ireland	22
	Denmark	24
	UK	26
Average performance	Spain	33
	Czech Republic	34

N.B. Countries in italics requested for inclusion in the sample of 15 plus the UK by DfE. Other countries selected from EIU data by agreement with the aim of providing a spread of countries by PISA ranking and geographically

2.2.2 Structural Indicators Data

The indicator evidence used in this report is based on data collected for the Economist Intelligence Unit in 2012, which led to the publication of **Starting Well: Benchmarking Early Years Education across the World**. This study aimed to analyse and benchmark the quality and inclusiveness of the early education system in 45 countries using a set of agreed structural and systemic indicators. These indicators included the 5 structural indicators used with this report and we drew on the EIU evidential data base to compare the system profile and performance of the 15 countries plus the UK in relation to each of these indicators of system quality, exploring patterns and associations between these indicators both within and between countries.

According to the *Starting Well Index*, the 15 countries in our study group plus the UK, were ranked in the table below (Fig 2). This table also reveals the relative ranking of countries between the PISA ranking and the EIU ranking and illustrates the differences in approaches and results of the two ranking scales: one of which focuses on system quality and the other which focuses on system outcomes. This comparison shows that a country may do well on one ranking system and not so well on the other. For example, the UK is ranked 26th on PISA ranking but 4th on the EIU ranking; China is ranked 1st on PISA ranking but 42nd on the EIU ranking. This difference may be explained by system lag on outcomes; on cultural differences in the functioning of very different systems; on the accuracy of both ranking systems and on the mismatch between measured educational outcomes and system preferred outcomes in some countries, amongst other possible explanations.

Figure 2 Study countries and their EIU Starting Well (2012) ranking positions

Country (listed in order of PISA rankings)	EIU ranking (2012) out of 45
China	42
<i>Finland</i>	1
Singapore	29
<i>Canada</i>	26
<i>Australia</i>	28
<i>Netherlands</i>	8
<i>Belgium</i>	5
Norway	3
Germany	11
Sweden	2
<i>France</i>	7
Republic of Ireland	18
<i>Denmark</i>	6
UK	4
<i>Spain</i>	14
Czech Republic	17

The EIU rankings were derived from Index scores which were given across 4 categories: Social Context, Availability, Affordability and Quality. Within each category the overall score is calculated through a combination of quantitative and qualitative data. For the qualitative evaluations, criteria were provided for a ‘best-fit’ descriptor, based on 5 possible statements. For example, to rate ‘staff training and qualifications’ a score of **1** would be given if there were “no formal eligibility qualifications mandated for pre-school teachers”. To merit a score of **5**, there would need to be evidence of “well-defined eligibility qualifications for preschool teachers” which are “adequately enforced” and “reviewed routinely”

Inevitably, in a ‘best-fit’ descriptor, there has to be some parts of the description which may not be totally fitting, and an overall judgment has to be made. In order to arrive at a fair and informed judgement of each of the 10 areas, a leading academic researcher or author in each country was interviewed to give a detailed picture of the area to be evaluated. All judgements were made after examining, in detail, all the available contextual evidence and the scores were moderated across teams. Where there was uncertainty, a second expert opinion was sought from a leading Early Years expert in the country concerned. A full list of the assessment criteria used for these indicators is attached in Appendix 2

In order to complete this report, selected data gathered for the EIU '*Starting well: Benchmarking early education across the world*' (2012) report, was consolidated into a matrix for analysis (see section 3.1) to compare the structural characteristics of systems for 3-5 year olds across all 15 countries plus the UK, looking at 5 key indicators:

Indicator 1: staff: child ratios⁹

Indicator 2: staff training and qualifications

Indicator 3: regulation and data collection

Indicator 4: government strategy and investment

Indicator 5: national preschool curriculum requirements

The evidence gathered in support of the EIU ranking scores has also been drawn upon to provide the short contextual summary for each country.

⁹ It should be noted that when a country is referred to as having a 'high' staff: child ratio it would have a greater number of staff per same sized group of children than a country with a 'low' staff: child ratio.

3. Analysis

The data from the EIU study in relation to the 5 chosen structural indicators has been analysed and considered in relation to the PISA study results in the 15 focus countries plus the UK. This analysis is presented in three sections:

- Country contexts
- Patterns (of indicators between countries/groups of countries)
- Associations (with PISA rankings)

3.1 Country Contexts

This section will provide a short contextual commentary for the 15 selected study countries plus the UK on changes to the 5 structural indicators of their early education system over the last 5 years. It also presents a summary of the level of child physical wellbeing for each country.

Contextual Changes Data

The table below provides a summary of information on recent structural changes to the early education system in the study countries. For each of the 5 structural indicators we have shown where change has taken place over the last 5 years or is currently taking place.

Figure 3 A table to show against which indicators each country is enhancing in its early years system according to EIU data.

	China	Finland	Singapore	Canada	Australia	Netherlands	Belgium	Norway	Germany	Sweden	France	Ireland	Denmark	UK	Spain	Czech Republic	Totals
Indicator 1: staff to child ratios	■				■			■		■							4
Indicator 2: staff training and qualifications	■				■	■		■	■	■		■	■	■			8
Indicator 3: level of regulation and data collection	■	■	■		■	■		■		■		■	■	■		■	11
Indicator 4: government strategy and investment	■	■		■	■	■	■	■		■		■	■	■		■	12
Indicator 5: national preschool curriculum requirements	■				■	■		■		■		■		■	■	■	9

The Child Physical Well Being Data

The data presented in the table below provides a score for each country calculated using the following indicators:

- Malnutrition prevalence
- Under 5 mortality rate
- Immunisation rate, DPT (Diphtheria, Pertussis, Tetanus)

The Child Physical Well being score is on a scale of 1-5, with 5 indicating high levels of child physical well being and health.

Figure 4 A table to show how each country performs in terms of physical well being

	China	Finland	Singapore	Canada	Australia	Netherlands	Belgium	Norway	Germany	Sweden	France	Ireland	Denmark	UK	Spain	Czech Republic
Physical Well Being (1-5)	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

These contextual data indicates that:

- All countries in this study have relatively healthy, nourished children coming into the early education system, with only China still having variable child well being due to poor health services for children in rural and remote areas and amongst the poor.
- All of the countries in this study (with the exception of France) have made significant changes to at least one of the 5 structural indicators over the last 5 years, with 10 of the countries making changes to two or more of the structural indicators, and 7 making changes to at least four of the indicators, including four countries in the top performing group (China, Australia, Netherlands and Norway). Singapore also has major changes planned to improve all of these indicators, following the publication of the EIU Report, and their poor ranking in this Index. Significant changes to all five indicators have been, or are being, implemented in China, Australia, Norway and Sweden. China, Australia and Norway in particular, are making significant improvements across the structural indicators explored in this review despite already being in the highest performing group of countries.
- The most common improvement in these indicators is the development of a national early years' strategy with significantly increased investment at government level. 12 of the countries are increasing the level of investment in early education, and this is across all the three performance groups, including top performing countries. The aim is to ensure greater

access to early education, especially to socio-economically disadvantaged children, and to improve the quality of provision for all.

- The second most common improvement is increased regulation and data collection for the sector. The development of quality assurance systems, regulations to ensure agreed standards are met, and closer monitoring of provision and access are aspects of these changes. 11 of the countries in this study have introduced greater regulation of the sector, and this is across all three performance groups, including high performing systems.
- Improvements to staff training and qualifications (which includes eligibility qualifications on entry, enforcement and review (see appendix 2 for full criteria)), and the introduction of a national preschool curriculum, have taken place in about in half of the study countries over the last 5 years, indicating that greater consistency of pedagogic practice and a focus on the quality of educational programme are seen as important elements of an early education system.
- The indicator which has been subject to least change in the study settings is staff: child ratios. Increasing the number of staff to the number of children is evident in only 4 of the study countries, but it is interesting to note that 2 of these 4 are high performing, non-European countries (China and Australia), in which historically the number of staff to children has been much lower and class sizes have been much larger than in other OECD countries. The other two countries are Norway and Sweden which have had historically high staff: child ratios (i.e. high number of staff to the number of children) but are working to increase this ratio further.

In summary, it would appear from this analysis that there is a convergence underway for all 15 countries plus the UK on each of the 5 structural indicators. Ongoing innovation in all the study countries, both European and non-European, other than France and Germany, reveal that they are all aiming over time to make progress on all or at least some of the structural indicators as follows:

- More state investment in preschool to secure more equitable access
- Higher staff: child ratios (higher number of staff to the number of children)
- Better trained and qualified preschool workforce
- A regulated and data evidenced system
- A national preschool curriculum for all providers

These reforms appear to be in line with international research evidence¹⁰ that these factors are correlated with later academic success. Policy makers around the world are taking this research evidence seriously as they develop their national strategies for education from birth.

3.2 Patterns (of indicators between countries/groups of countries)

This section of the analysis sets out patterns within and between the 5 structural indicators in early education provision across the 15 selected study countries plus the UK. Using the EIU data and assessment framework, the table below sets out the level of response in each country for each structural indicator:

Figure 5 Table showing indicator scores for each country, ranked by PISA scores.

	China	Finland	Singapore	Canada	Australia	Netherlands	Belgium	Norway	Germany	Sweden	France	Rep Ireland	Denmark	UK	Spain	Czech Republic
Rankings																
PISA (2009) 3 yearly test for 15 year olds (65 in sample)	1	3	5	6	9	10	11	12	19	20	21	22	24	26	33	34
EIU Preschool report 2012 (45 in sample)	42	1	29	26	28	8	5	3	11	2	7	18	6	4	14	17
Indicators																
Indicator 1: Average number of children per teacher in preschool classrooms	24	11	22	18	14	8	16	14	13	6	22	20	9	13	13	14
Indicator 2: Staff Training & Qualifications	1	5	4	4	3	4	5	4	3	5	4	3	4	5	4	4
Indicator 3: Level of regulation and Data Collection	2	5	2	3	2	4	5	3	3	5	3	3	4	4	2	2
Indicator 4: Government Strategy & Investment	3	4	4	3	4	3	5	5	3	5	4	4	4	5	4	3
Indicator 5: National Preschool curriculum requirements	1	5	4	3	4	2	5	4	4	5	5	4	4	5	4	4

The table shows that there is a considerable range in responses to each of the 5 structural indicators both within and between countries. For example, the highest and most consistent scores across all the structural indicators are found in Finland, France, Belgium, Sweden Denmark, and the UK– all European countries and all scoring particularly well on these five indicators. The lowest and least consistent scores are found in China.

When we look at the pattern of response to each indicator we see that there is quite a large variation on the **staff: child ratios**, stretching from 1:6 to 1:24 with the smallest number of children to a teacher being found in Sweden and The Netherlands and the highest number of children to a teacher in China, Singapore and France. The UK currently sits around midpoint in relation to staff: child ratio with 13 children to each teacher.

¹⁰ Jacob B.A and Ludwig J (2008) 'Improving Educational Outcomes for Poor Children' in *Social Mobility and Education: Academic Papers presented at a high level summit sponsored by the Carnegie Corporation of New York and the Sutton Trust, 1-3 May 2008.*

When we look at **staff training and qualifications** we see that the large majority of countries in this study have an approach of putting in place high quality staff training and qualifications in their early education services. The UK scores well here with China standing out as the poorest in this respect, and Germany and Ireland doing least well of the European countries.

Level of regulation and data collection provides a more mixed picture, with some countries having highly regulated early education systems (Finland, Netherlands, Belgium, Sweden, Denmark and the UK) and others having much lower levels of regulation (China, Singapore, Australia, Spain and Czech Republic). The UK scores 4 out of 5 on this indicator.

The existence of a **Government strategy with a high level of investment** provides a more consistent picture, with 11 of the countries scoring highly on this indicator, and in particular, Belgium, Norway, Sweden and the UK. Countries with less central direction and investment are China, Canada, The Netherlands, Germany and Czech Republic.

Finally, the implementation of **national, preschool curriculum guidelines** can be found in 13 of the countries, with Finland, Belgium, Sweden, France and the UK scoring the highest on this indicator and China scoring the lowest.

When we look at patterns in this data we can see that some countries score well on PISA and not on the EIU Index and vice versa. The data reveals a complex picture when we look at the patterns between indicators. For example, if we look at the relationship between staff: child ratio and staff training and qualification we see that there are some countries that have fairly average staff to child ratios but high qualifications (Belgium), some have low staff: child ratios (i.e. low number of staff to number of children) and low qualifications (China and Ireland). However, overall we can say that countries with higher staff: child ratios (i.e. higher number of staff to number of children) tend to have largely better qualified staff.

3.3 Associations (with PISA rankings)

This section of the analysis looks at the associations between each structural indicator and the PISA rankings. When we looked for patterns across the countries for each indicator's association with PISA rankings, we found clear differences in the patterns between European and non-European countries, i.e. the patterns in Australia, Canada, China and Singapore were different to the rest of the study group across all five structural indicators. It is interesting that all these non-European countries were in the top performing group. The exact reasons for the difference in patterns between European and non-European countries are not possible to tease out from the data sets available and further research is needed in this area.

Given this observation, we wanted particularly to explore in what ways Finland, Netherlands, Belgium and Norway, which generally fitted the European pattern of response but were performing as well as these non-European countries (and were in the top performing group), were similar or different to their European neighbours. We also wanted to explore what they might be doing that was different to other European countries in the study that could be a factor in their relatively high

performance. We felt this might be a more useful way of identifying useful pointers for policy. In a similar vein, we have also considered the group of average performing European countries (Czech Republic and Spain) in order to assess whether they might be doing anything that was different from other European countries in the study that could be a factor in their relatively lower performance.

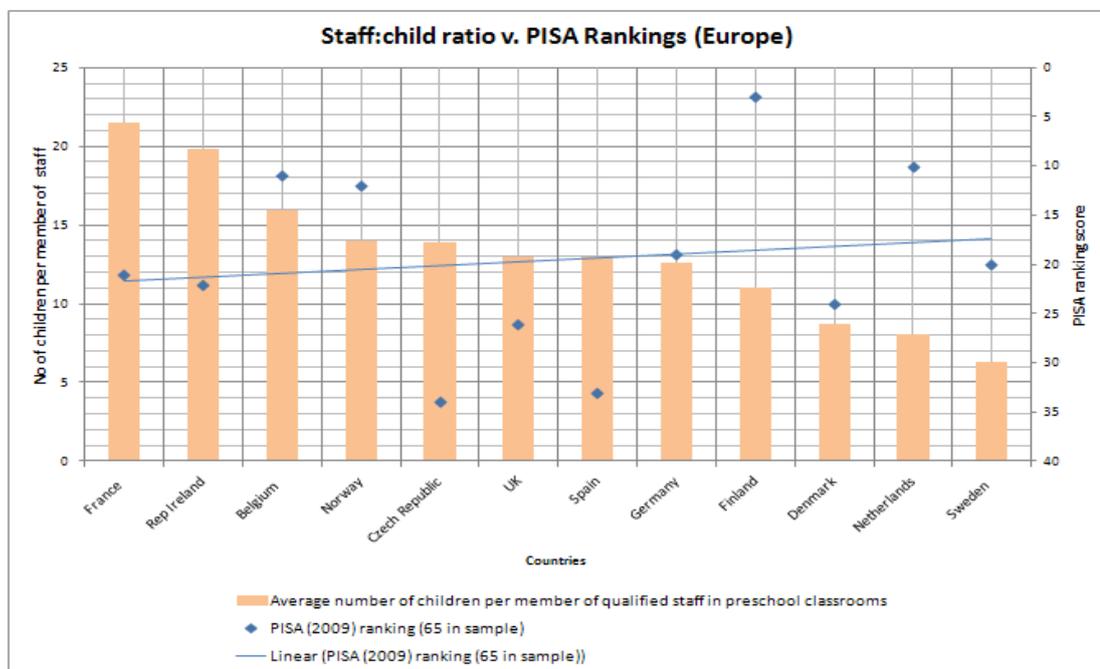
We have therefore analysed and presented the evidence in two groupings for each indicator. One chart displays the Europe only data and then we present the data for all the study countries in a second chart, with a short commentary for each, which explores possible patterns and associations between the indicator at preschool level and the PISA ranking.

Finally, as an additional focus we have considered the data for the UK against a DfE selected group of European countries (Germany, France, The Netherlands and Denmark) in order to draw out any key similarities or differences in approach.

Indicator 1: Staff: child ratio

This indicator reveals the average number of staff to the number of children in centre-based preschool classrooms in the study countries, presented as a ratio, and sets these against PISA rankings.¹¹ Home-based provision e.g. childminding is not included in the data. The results are set out in the charts below:

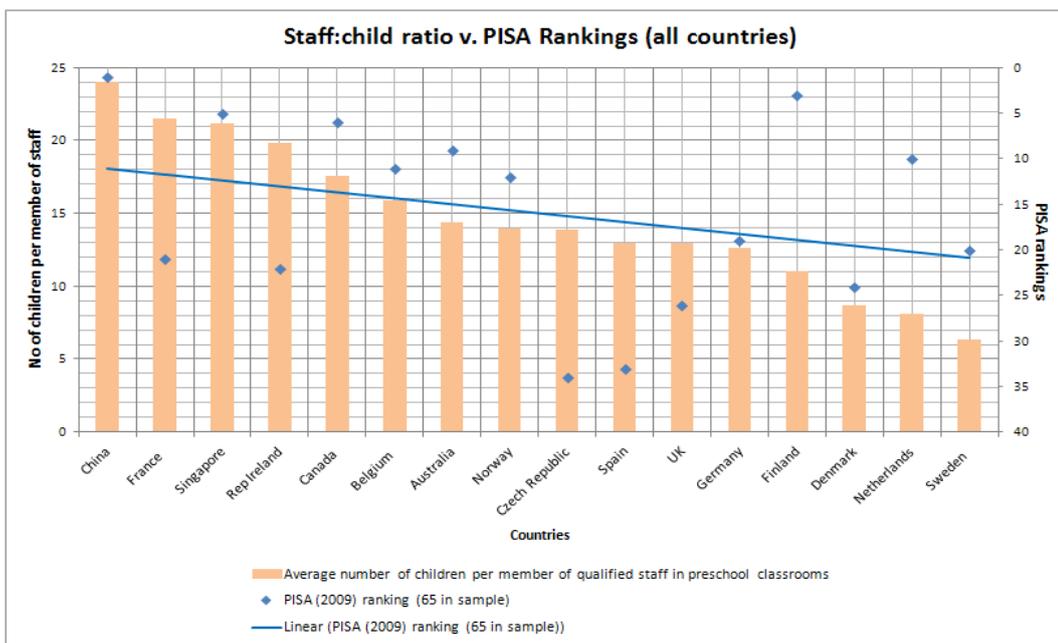
Figure 6 Graph showing the no. of staff to children v. PISA rankings for the European study countries.



¹¹ It should be noted that due to different school starting ages across the globe the ages of 'preschool' children can vary between 3 to 6 years of age. The data, as with all other data in the report is derived from the EIU report. For this indicator data was drawn from OECD and UNESCO figures as well as independent EIU analysis.

This chart shows that for European countries the range of staff to child ratios for preschool classes is from 1:22 in France to 1:6 in Sweden. Across the study group there does appear to be a consistent association between high staff: child ratios and high performance on PISA rankings as demonstrated by the blue trend line. The Netherlands, Sweden, Denmark and Finland all have high staff: child ratios (equivalent to one teacher for no more than between 6 - 12 children) and all score well in the PISA rankings ('Top Performing' or 'Above Average'). The UK staff: child ratio places it within the middle of the pack with similar ratio levels to Czech Republic, Spain and Germany.

Figure 7 Graph showing the no. of staff to children v. PISA rankings for all study countries



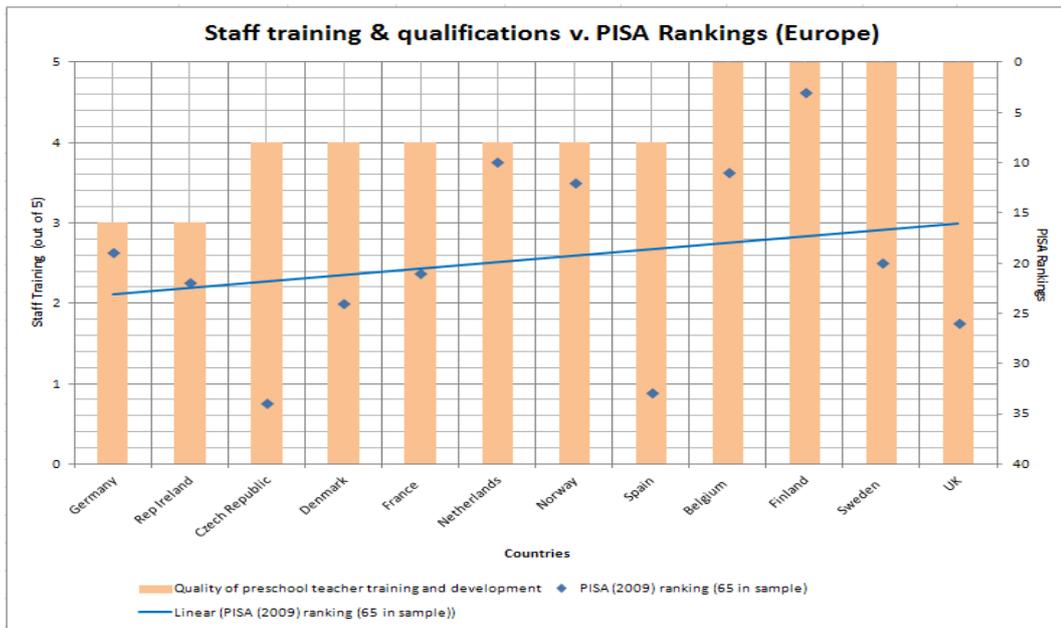
When we include non-European countries in the data set, the association between high ratios and high PISA performance is no longer evident; the trend in fact reversing to reflect the low staff: child ratios but high PISA performance of the Non-European countries, particularly China and Singapore. The UK remains within the middle group of countries for ratios. China and Singapore are currently working to increase their staff: child ratios.¹²

Indicator 2: Staff Training and Qualifications

This indicator reveals the quality and level of staff training and qualifications in the study countries and sets these against PISA rankings. The results are set out in the charts below:

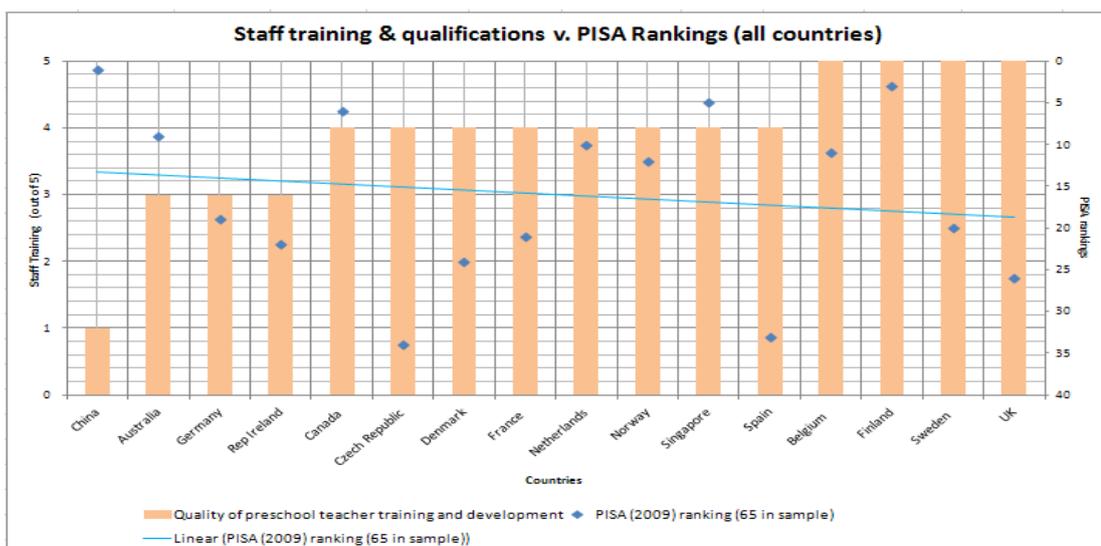
¹² Pascal, Bertram et al (2012), *The Impact of Early Education as a Strategy in Countering Socio-economic Disadvantage: A report for Ofsted*

Figure 8 Graph showing the EIU scores for staff training & qualifications v. PISA rankings for the European study countries



This chart shows that most of the European countries in the study have implemented strategies to provide a highly qualified and trained preschool workforce, with only two European countries (Germany and Republic of Ireland) having a less well implemented and integrated policy in this respect (and they are currently planning to change this). The European data reveals a consistent association between the quality of preschool staff training and qualifications and later school performance. The UK sits in the top four in this respect, alongside Finland, Belgium and Sweden, all of whom are in the ‘above average’ or ‘top performing’ groups.

Figure 9 Graph showing the EIU scores for staff training & qualifications v. PISA rankings for all study countries



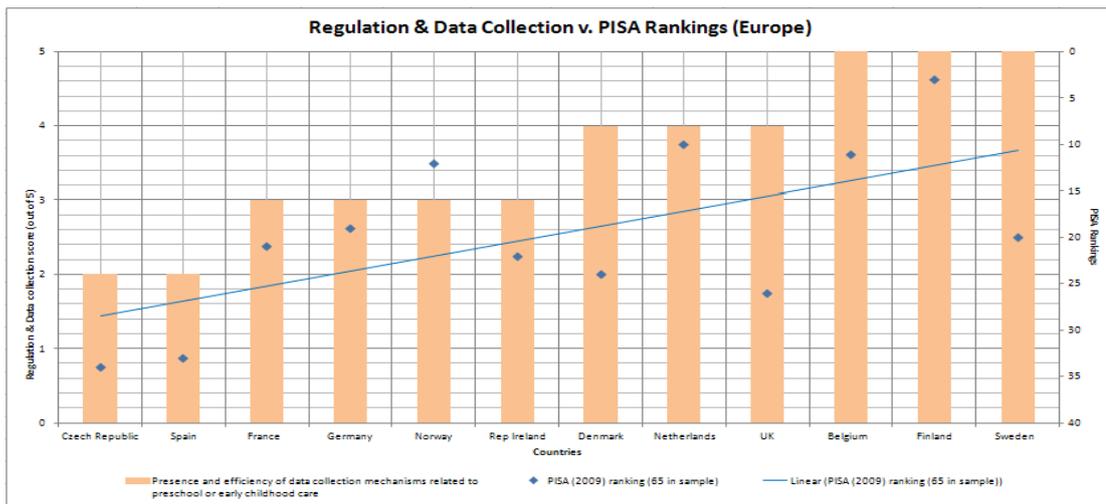
When we include non-European data in the above chart we can see that this trend is reversed, with an apparent disassociation between the quality of preschool training and qualifications and

later school performance. This data is highly skewed by China’s low score on this ranking (1/5): without China in the data set, the graph would show no overall pattern.

Indicator 3: Level of Regulation and Data Collection

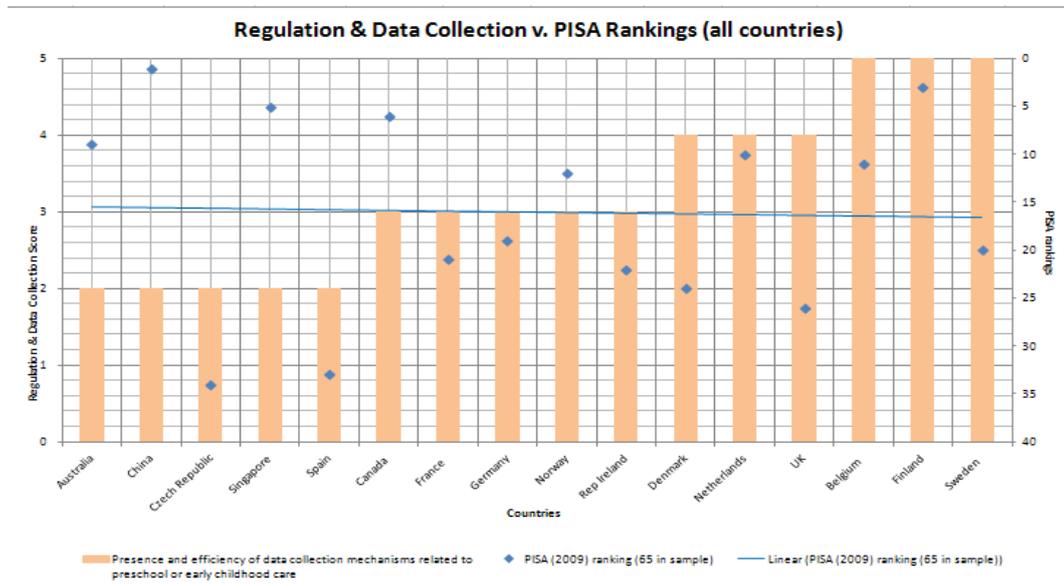
This indicator reveals the presence and efficiency of regulation and data collection mechanisms and sets these against PISA rankings. The results are set out below.

Figure 10 Graph showing the EIU scores for regulation & data collection v. PISA rankings for the European study countries



This chart shows that the presence and efficiency of regulation and data collection varies widely across the European countries in the study, with Czech Republic and Spain, the two ‘average’ performing countries according to PISA, having the least regulated preschool systems and Finland, Denmark and Sweden having the most regulated systems. This chart shows a strong association between the presence and efficiency of preschool regulatory systems and data collection and later performance in PISA rankings. The UK has high levels of regulation and data collection similar to Denmark and the Netherlands, although not quite as high as Belgium, Sweden and Finland who obtained a maximum score of 5/5 in this category.

Figure 11 Graph showing the EIU scores for regulation & data collection v. PISA rankings for all study countries

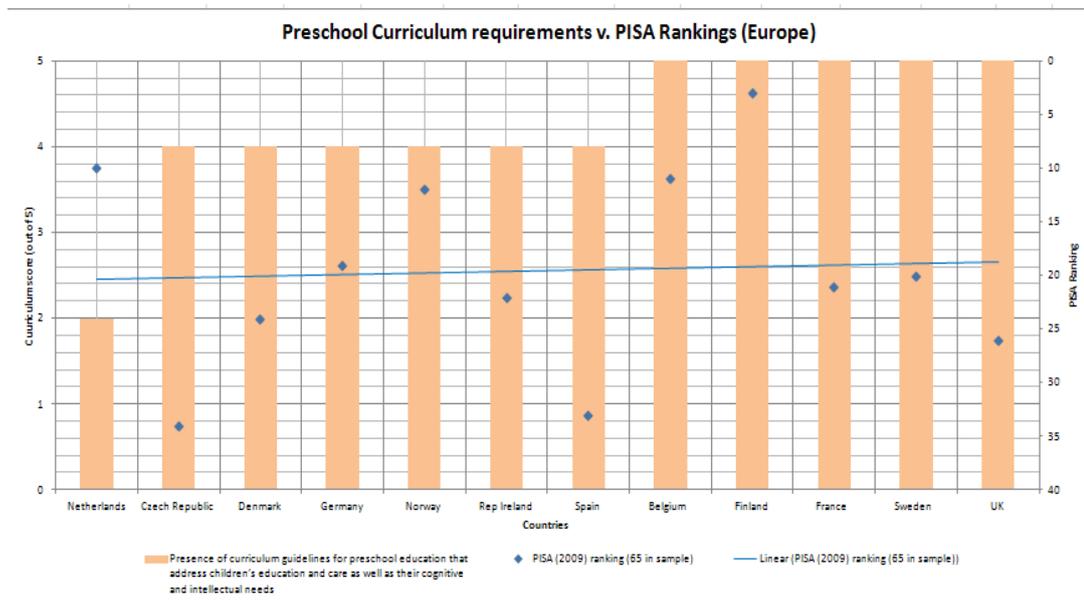


When we include non-European data in the above chart the associations are less clear. The UK sits in the middle of the spectrum in terms of regulation and data collection, alongside Canada, Germany, Ireland, Norway and France but behind other Scandinavian countries and Belgium. Australia, China and Singapore all have similar levels of regulation and data collection as the poorest performing European countries of Czech Republic and Spain.

Indicator 4: Curriculum Requirements

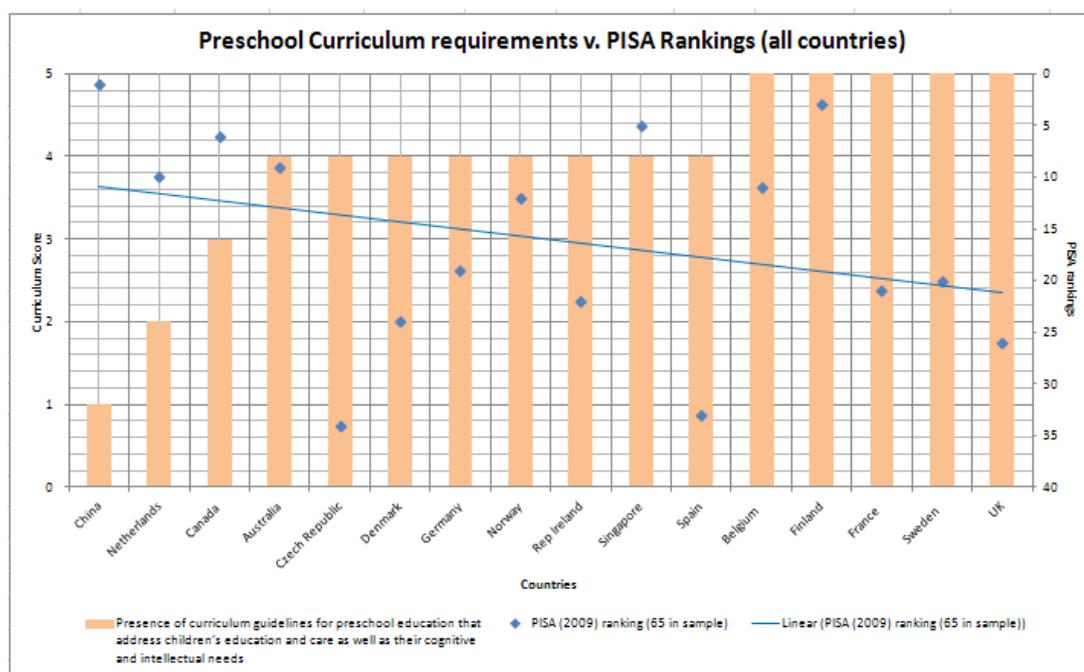
This indicator reveals the presence of a national framework of curriculum guidance for preschools and sets these against PISA Ranking. The results are set out in the charts below.

Figure 12 Graph showing the EIU scores for Preschool curriculum requirements v. PISA rankings for the European study countries



This chart shows that most of the European countries in the study have, or are developing, national preschool curriculum guidelines. The Netherlands seems to stand out as not having these in place for all their settings, yet being in the ‘top performing’ group on PISA rankings. This chart shows no consistent association between the presence of national preschool curriculum guidelines and later school performance.

Figure 13 Graph showing the EIU scores for Preschool curriculum requirements v. PISA rankings for all study countries

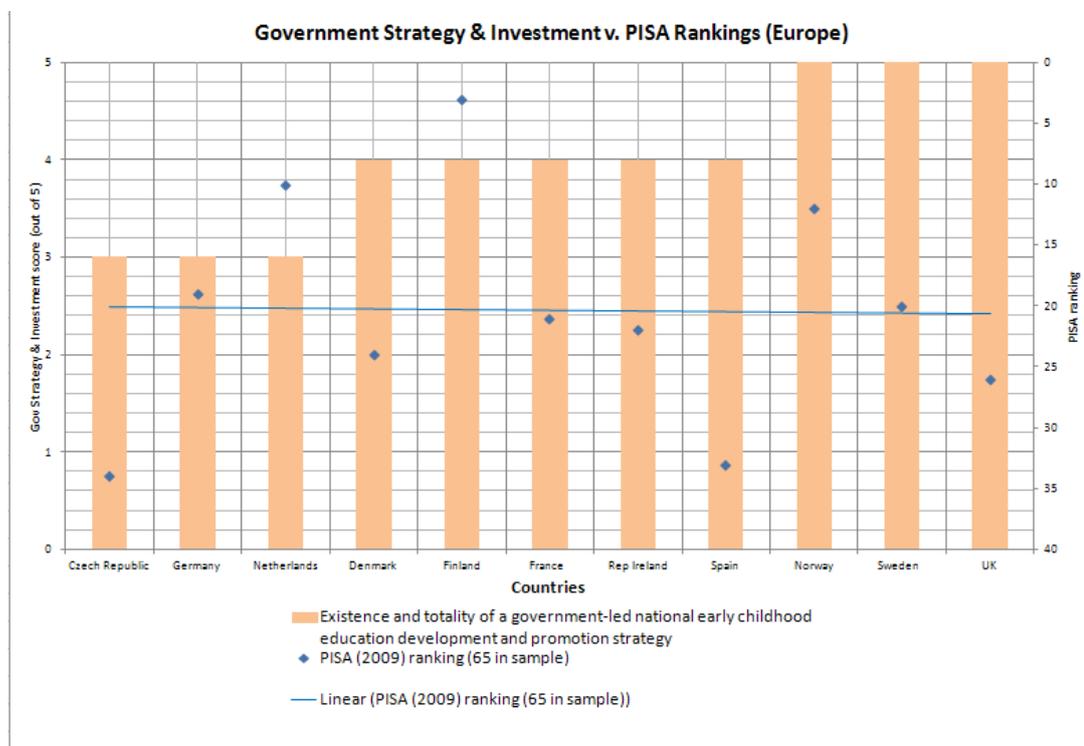


When we include non-European data in the above chart it can be seen that the vast majority (13/16) score 4 or 5 out of 5 against this indicator. The exceptions to this are Netherlands (as discussed above) and Canada and China (Australia and Singapore both score 4/5). The UK sits in the top 5, alongside Finland, France, Belgium and Sweden in providing curriculum guidelines, all of whom are in the higher or medium performing groups. Again, if China is removed from the selection it can be seen how much this data skews the overall trend.

Indicator 5: Government Strategy and Investment

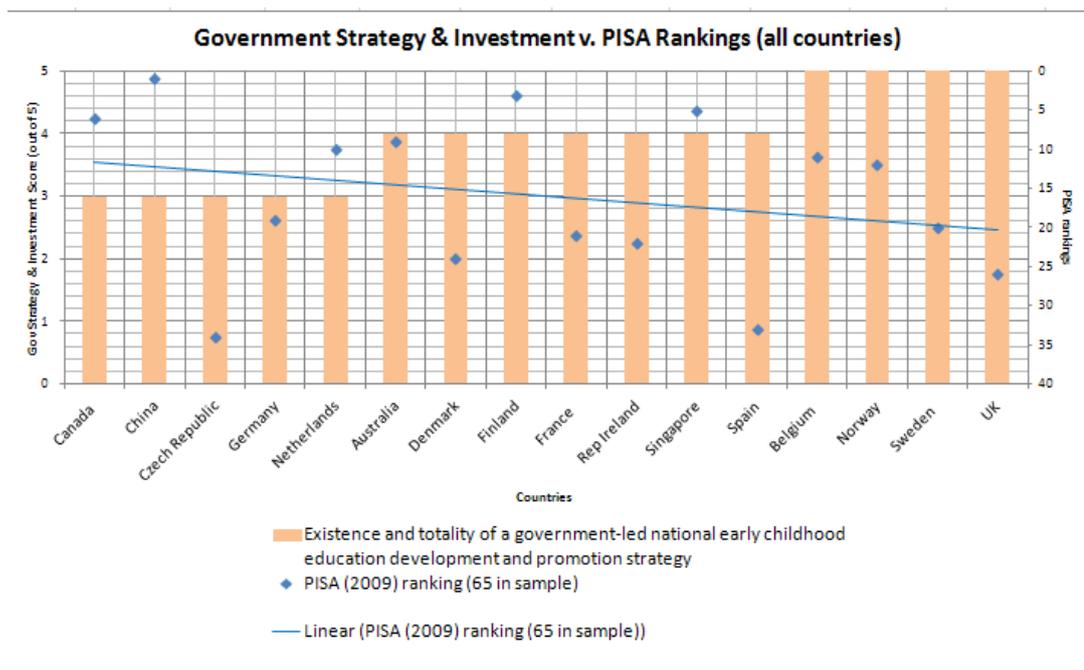
This indicator reveals the existence of a well funded, government-led, national early years strategy and sets this against PISA rankings. The results are set out in the charts below.

Figure 14 Graph showing the EIU scores for Government Strategy v. PISA rankings for the European study countries



This chart shows that most of the European countries in the study have, or are developing, a funded, government-led, early years strategy. Germany, The Netherlands and Czech Republic have made less investment at state level. The UK performs strongly at this indicator alongside Norway and Sweden in this respect. The chart shows no clear association between the existence of a funded, government-led, early years' strategy curriculum and later school performance.

Figure 15 Graph showing the EIU scores for Government Strategy v. PISA rankings for all study countries



When we include non-European data in the above chart it can be seen that China and Canada join the lowest scoring European countries with scores of 3/5, which changes the overall trend to suggest that there is no association between the existence of a funded, government-led, early years strategy curriculum and later school performance. Australia and Singapore, however, score 4/5 which places them on a par with the majority of European countries ranging from ‘top performing’ Finland and ‘average’ performing Spain which suggests that this data is inconclusive.

3.4 Summary of Findings

The evidence does reveal some interesting associations between the structural indicators at preschool level and later school performance (as demonstrated via PISA rankings) as a measure of system effectiveness. In particular:

1. Finland and The Netherlands are high performing European countries judged on later (PISA) school performance and when we look at their pattern of provision in respect of the structural indicators compared to other European countries we can see:
 - a. They both have higher numbers of staff to children than most other European countries
 - b. They both have relatively higher levels of regulation than other European countries
 - c. They are both in the low or middle range as regards the existence of a Government-led strategy and the level of investment compared to other European countries
 - d. They have very different responses to levels of staff training and qualification, with Finland scoring more highly than most European countries and The Netherlands much lower

- e. They have very different responses to national curriculum guidelines for preschool, with The Netherlands not having national curriculum guidance and Finland having national preschool curriculum guidelines
2. If the average performing (PISA) countries are considered, (Czech Republic, Spain) it can be seen that they share similarities across the indicators. Although each country scored lower in terms of regulation and data collection (2,3), their main association is the way that, although they score reasonably well across most structural indicators, they never score maximum points in any one area, and can, at best, be found within the middle section of the wider European dataset. Across the board they perform less well than those European countries that rank higher according to PISA.
 3. When we look at the pattern of policy response to each indicator by non-European countries we can see that they often have a very different pattern to European countries and we can see in all the non-European countries:
 - Lower number of staff to children
 - Relatively lower levels of training and qualifications
 - Lower levels of regulation
 - Relatively less national curriculum guidelines for preschool
 - An average level of government policy and investment in preschools (scoring either 3 or 4 out of 5 on par with most European countries although lower than Belgium, Norway, Sweden and UK who all score 5 out of 5)
 4. The current pattern of response to each structural indicator in all the non-European study countries (and many European countries) should be viewed as fluid (See Fig. 3) as many are significantly reforming their preschool systems currently to achieve:
 - Higher staff: child ratios (higher number of staff to number of children)
 - Higher workforce qualifications and training
 - Higher regulation
 - Establishment and enforcement of national preschool guidelines
 - Increased investment in preschool to expand access, especially for the poor and disadvantaged
 5. The UK is either performing at the same level or higher than the other countries in the DfE selected sample group of 4 European countries (France, Germany, Denmark, and The Netherlands) in 4 of the 5 of the indicators. The UK received the highest score (5) in Staff Training and Qualifications, Government Strategy and Investment, and Curriculum Requirements and a score of 4 in Regulation and Data Collection, putting it ahead of the other countries across these data sets. The UK does however rank 4th out of the 5 for the size of its Staff: Child ratios.

In supplying clear National Preschool Curriculum guidelines, the UK is judged to be on a par with France and higher than all others, and in Regulation and Data Collection, it ranks highest alongside Denmark and the Netherlands. Germany scores lower than the UK on each indicator. Netherlands receives no top scores and is behind UK in all 4 of the 5 indicators although it does have a considerably higher Staff: Child ratio (higher number of staff to children). Denmark scores highly (4) against each indicator but falls behind UK in terms of provision of a National Preschool Curriculum, and in the presence of high quality Pre-school Training and development.

4. Recommendations for Action and Further Innovation

The patterns and associations identified in the above analysis reveals some interesting trends within and between the study countries. To understand better how these structural factors impact on system performance requires:

- More robust research evidence which can definitively look at the impact of each of these systemic indicators on system performance in relation to child outcomes;
- Earlier and more robust evidence of the social and educational outcomes of preschool;
- More qualitative and fine grain national and international comparisons to examine how different cultural contexts affect the impact of the structural decisions made e.g. raising the number of staff to children; introducing national preschool guidelines; enhancing practitioner qualifications etc;
- Experimental, well documented and controlled innovations to explore the impact of lower and higher staff: child ratios on children's social and educational outcomes;
- Experimental, well documented and controlled innovations to explore the impact of enhancing staff qualifications and different kinds of professional training on children's social and educational outcomes;
- A study of how regulation works to improve outcomes for children;
- An examination of how these structural and systemic indicators vary internationally for children from birth to three years.

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Appendix 1: A summary of the supportive evidence for each of the 5 structural indicators

This evidence comes from a recent review of the current evidence base on the impact of early education as a strategy in countering socio-economic disadvantage undertaken by Pascal, Bertram et al¹³. The aim of this review was to:

1. Summarise and evaluate significant research in this area conducted over the last 10 years
2. Summarise key interventions and actions over the last 10 years and evaluative evidence on what has worked
3. Identify current issues and changes since 2000 in policy and practice in early education
4. Highlight key findings which will inform further action

This review explored the current evidence in relation to the impact of certain structural indicators in early education system on outcomes for children and a summary is set out below.

Staff: child ratios: There is some evidence that a higher adult: child ratio (ie a smaller group of children per adult) in early education programmes, particularly those working with less advantaged children, is helpful in ensuring the quality of interactions between educators and children^{14 15 16}. Higher ratios are seen to help to create a climate of emotional security, allow practitioners to be responsive to the needs of children and able to support them when they have needs or are in distress.

Staff training and qualifications: There is strong evidence that a well trained early years workforce, with high levels of qualification and access to ongoing professional development, is vital to close the achievement gap between children from poorer homes and their peers. There is a consensus that working in early years should not be seen as a less well paid, lower status and less skilled job than working with older children. Research from the UK, the US, Canada and Australia shows that well targeted investment in training those who work with disadvantaged young children is a crucial strategy in countering educational underachievement. The education of the workforce matters because practitioners can do a lot to improve vocabulary, and enhance the cognitive and social skills of young children, particularly when they are not gaining these skills at home. The EPPE study makes a powerful case that teachers should be involved as part of a well qualified team of professionals working with young children, and particularly those who come from less advantaged homes. The evidence indicates that qualified staff provide children with more curriculum-related activities (especially in language and mathematics) and encourage children to engage in challenging play. Less qualified staff have also been shown to be better at supporting learning when they work with qualified teachers. The presence of well educated, professional staff

¹³ Pascal, Bertram et al (2012), *The Impact of Early Education as a Strategy in Countering Socio-economic Disadvantage: A report for Ofsted*

¹⁴ Howes C, Phillips D and Whitebrook M (1992) 'Thresholds of Quality: Implications for the development of children in center-based care' in *Child Development* 63 449-460

¹⁵ Jacob B.A and Ludwig J (2008) 'Improving Educational Outcomes for Poor Children' in *Social Mobility and Education: Academic Papers presented at a high level summit sponsored by the Carnegie Corporation of New York and the Sutton Trust, 1-3 May 2008*

¹⁶ OECD (2012) *Starting Strong III - A Quality Toolbox for Early Childhood Education and Care*

who use extended vocabulary and replicate what well educated mothers can do has been shown to be crucially important in improving school readiness.

Regulation and Data Collection: There is emerging evidence that reform to bring in better regulation and accountability in the early years sector can foster changes in behaviour and improve outcomes for disadvantaged children (although we must note that it can also lead to unintended consequences e.g. cutting corners, focusing on certain students, inflating test scores, narrowing the curriculum). The development of enhanced statutory standards, a comprehensive regulatory framework and more efficient systems to manage data, measure quality and evidence the impact of practice is associated with better quality, more effective targeting, the efficient deployment of resources at all levels and improved outcomes for the less advantaged.

Government strategy and investment: The evidence we have reviewed in the core documents supports the thrust of advice given in the Marmot Review 'Fair Societies, Healthy Lives' (2012)¹⁷, calling for a second revolution in the early years to increase the proportion of overall expenditure allocated to them, starting in pregnancy. The cost benefit analysis of investment in high quality early years programmes¹⁸ demonstrates that the highest per child benefits stem from programmes that focus on economically disadvantaged children. Indeed, studies¹⁹ have shown that these children make significant gains in cognitive, social-emotional development, and educational performance when they participate in high-quality early education programmes relative to children who do not participate. The economic benefits of these gains include increased earnings of the participants and public savings due to reduced crime and reduced need for rehabilitation and treatment. Cost benefit analysis²⁰ also shows that these benefits are higher than those from public investments like sports stadiums or office towers. Investments in early education are thus vital to the success of later investments made in primary schools. The consensus is that, when faced with a fixed budget, policymakers should reallocate their investments from later years to early years.

National preschool curriculum requirements: Recent research has indicated that there are some areas of learning and development that are particularly vital in the foundation years of life, and that a nationally agreed set of curriculum guidelines is helpful in ensuring an equal entitlement for all children.^{21 22} This evidence indicates that to support a child to be 'school ready' and able to operate as an effective learner, the early years curriculum needs to focus on both cognitive and non-cognitive aspects of early learning and, importantly, give the child a sense of their own capacity to be a successful learner. The evidence indicates that certain pedagogical practices are more effective than others in improving attainment for less advantaged children. The most effective pedagogy combines both 'teaching' and providing freely chosen yet potentially

¹⁷ Marmot M (2012) *Fair Society, Healthy Lives. Strategic review of health inequalities in England post 2010*

¹⁸ Heckman J (2012) The Case for Investing in Young Children in *Defending Childhood* ed. Falk B

¹⁹ Barnett, W. Steven and Belfield, Clive R. (2006): Early childhood development and social mobility. Published in: *The Future of Children*, Vol. 16, No. 2 pp. 73-98.

²⁰ Heckman J (2012) The Case for Investing in Young Children in *Defending Childhood* ed. Falk B

²¹ Pascal, C and Bertram, A (2008) *Accounting Early for Lifelong Learning* Amber Publications, Birmingham

²² Tickell C (2011) *The Early Years: Foundations for life, health and learning. An Independent Report on the Early Years Foundation Stage to Her Majesty's Government*

instructive play activities. Effective pedagogy for young children is less formal than for primary school but its curricular aims can be academic as well as social and emotional.

Appendix 2: A methodology statement of how the EIU scores for each of the qualitative indicators were calculated

Indicator 2: staff training and qualifications

Attributes to assess: Presence and scope of qualifications (basic, general certifications versus specialised degree programmes), and enforcement/monitoring and review mechanisms

1. There are no formal eligibility qualifications mandated for preschool teachers.
2. There are 'broad and general' eligibility qualifications required for preschool teachers but these are poorly defined and enforced.
3. There are well-defined eligibility qualifications for preschool teachers but these are poorly enforced.
4. There are well-defined eligibility qualifications for preschool teachers but there is limited and uneven enforcement.
5. There are well-defined eligibility qualifications for preschool teachers and these are adequately enforced. The qualification requirements are reviewed routinely.

Indicator 3: regulation and data collection

Attributes to assess: Presence and coverage of data collection mechanisms, regular reviews and dissemination

1. There are no data collection mechanisms related to early childhood care and education.
2. There is limited data collection on early childhood care and education, but this is not regularly updated and/or there are large data gaps.
3. There is adequate data collection on early childhood care and education, but this is not regularly updated and there are some data gaps. Public dissemination and sharing of data is poor.
4. There is adequate data collection on early childhood care and education and this is regularly updated. Public dissemination of data is limited.
5. There is a comprehensive and efficient data collection system in place for preschool or early childhood care. Data is regularly collected and updated. Public dissemination of data is good.

Indicator 4: government strategy and investment

Attributes to assess: Comprehensiveness of strategy in terms of vision, goals and objectives; effectiveness of strategy in terms of implementation mechanisms; presence of specific milestones and provision for regular review and improvement

1. There is no government-led national early childhood education (ECE) development and promotion strategy.

2. There is a government-led strategy on ECE development and promotion. However, it is merely a statement of broad intent. It does not contain a clear vision or specific milestones to achieve. There are no clear mechanisms in place to achieve the strategy.
3. There is a government-led national strategy on ECE development and promotion in place. This has a broad vision, and loosely defined milestones (no specific targets). There are limited mechanisms in place that aim to achieve milestones. In federal-structure countries, states are not mandated to follow the national strategy i.e. it is only prescriptive in nature.
4. There is a well-defined, government-led national strategy on ECE development and promotion. It has a clear vision and specific milestones. There are mechanisms in place and guidelines on implementation.
5. There is a comprehensive strategy on national ECE development and promotion. It has a clear vision, clearly defined targets, action plan and strong mechanisms in place to achieve targets. In federated-structure countries, there are strong and clearly defined strategies that individual states must follow. These mechanisms and milestones are regularly reviewed and updated.

Indicator 5: national preschool curriculum requirements

Attributes to assess: Presence, scope and comprehensiveness of curriculum guidelines (basic education and care versus cognitive and intellectual needs), and enforcement/monitoring and review mechanisms

1. There are no curriculum guidelines for preschool education.
2. There are broad and general guidelines that address children's basic education and care, but there are no specific curriculum guidelines that cover individual's cognitive and intellectual needs.
3. There are broad and general guidelines that cover children's basic education, care, cognitive and intellectual needs. There are, however, no enforcement/monitoring mechanisms in place.
4. There are well-defined guidelines that cover children's basic education, care, cognitive and intellectual needs. There are, however, limited enforcement/monitoring mechanisms in place.
5. There are well-defined guidelines that cover children's basic education, care, cognitive and intellectual needs. There are adequate enforcement/monitoring mechanisms in place. Curriculum guidelines are routinely reviewed.



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