Gilt Watch Together™ is an analysis design concept in the context of understanding commercial lifecycle production in pigs, based on existing data made available through proprietary pig performance recording software.

Within the design is the ‘One-Pig’ concept that seeks to understand the overall performance of the herd represented statistically by one pig, either the sow or a single offspring. The context of the analysis is the 3E’s of Economic, Ethical, and 3Environment al efficiency and responsibility.

The design of analysis techniques includes the ‘Herd Within the Herd’ reporting (HWtH), which will be included in these pages.

Stephen Hall May 2024.

Gilt Watch Together™ & One-Pig

The data explained and illustrated below is from a typical Breed to Finish herd that can be found anywhere in the global family of pig production that is limited to a 1 to 7 parity distribution profile. The performance is selected for its representative strength that could be found from somewhere reasonably central within the broad spectrum of commercial performance.

Introduction:

I believe that we should be able to walk through a herd of breeding sows with a parity distribution of 1 to 6 and see very little variation in the comparable body condition, and physical size, proportionate to age. I also do not believe there is any justification for the spectrum of physical size within the population to vary much between the pregnant sow at parity 2 and the weaned sow at parity 6. The real optical illusion we see in most breeding herds, of a wide range of variation in size is the result of compensatory sow retention. This compensating management strategy is the result of the failure to manage replacement gilts from the off. This leads to a wide range of physical proportions across, and between, animals in each of the production cycles, and an extension of the herd parity profile often into double figure lifecycles for the survivor sows that compensate for the early exit gilts and sows. All this arises from the failure to manage replacement gilts, creating an oscillating and variable parity distribution which diminishes the genetic potential of the feeding herd output. This penalizes pig production businesses significantly. How significantly has been my intense focus for the last ten years.

Replacement Breeding Gilt Selection & Preparation:

The first choice taken when selecting and preparing the replacement breeding gilt is the genetic composition of the animal. There is a wide range of genetics available from pure breed pedigree lines through to multiple breed hybrids. The choice is unique to the business strategy, and based on the production system and the range of output options in terms of the point at which the business takes a profit from the pig. These will include, at the farm gate, or at the various points along the supply chain ex-farmgate to point of retail sale. It will also be determined by the type of product quality the business intends to produce, from limited backfat contract stipulations (P2) to intramuscular fat (IMF).

One of the terms used to promote genetic quality values is 'heritability'.

'Genetics', in terms of intellectual discussion about the development of the commercial agriculturally managed pig for the purpose of human food production has commanded the industry narrative for the last 60 years, largely by acquiring the exclusive rights to use of the word 'Heritability'. Here are a few distinguished definitions of heritability:

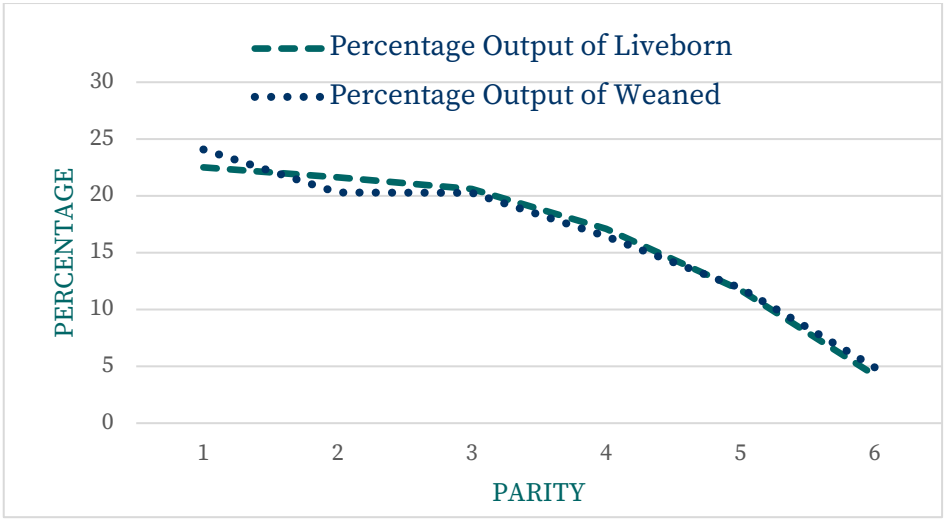
- *Biology:* A measure of the degree to which the variance of a particular phenotype is caused by genetic factors.
- *Ecology:* A measure of the degree to which a phenotype is genetically influenced and can be modified by selection.
- *Environment & Conservation:* A measure of the extent to which a characteristic in an organism is related to genetic, inherited factors relative to the 'mean' (mathematical average) of the population.
- *Zoology:* The measure of the degree to which a phenotype is genetically influenced and can be modified by selection.

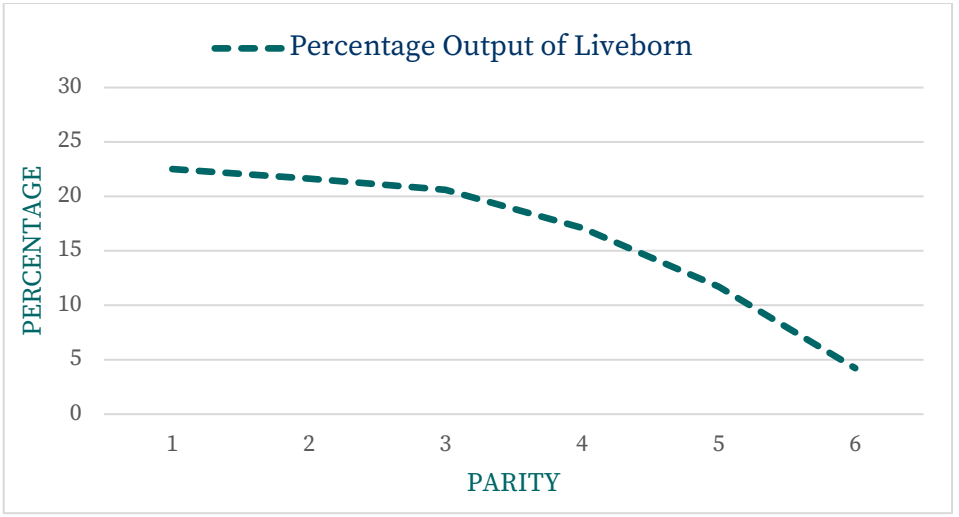
There is another word that appears in three of the four definitions 'Phenotype', and which could be considered defined in the other definition as "a characteristic in an organism…related to genetic, inherited factors. A more distinguished and direct definition is:

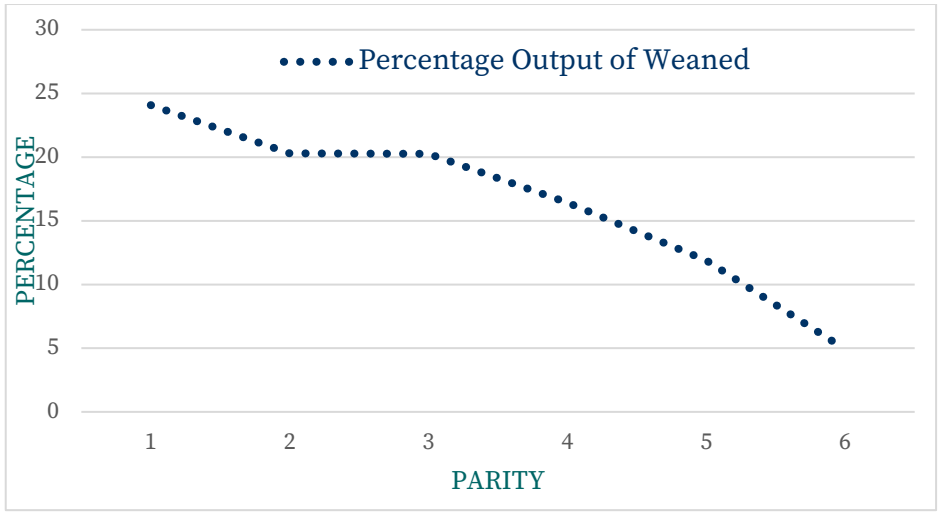
- *Phenotype:* The observable characteristics or traits of an organism that are produced by the interaction of the genotype and the environment; the physical expression of one or more genes.

My simple (*non-scientific*) understanding, as a lifelong practical pig-man would be that the true command of the central operational narrative of the pig production industry is one of equity of value between the partnership of genetic development, and focused strategic husbandry. To this end I offer the following thoughts, in 'Words & Pictures'.

The following sequence of graphs illustrate a single year's production in 52 HWtH analysis of weekly service groups in completed production cycles. Beginning with 3 graphs (*page 3*) of the percentage output Liveborn and weaned by parity (distribution).







The next 4 graphs in the sequence (*page 5*) illustrate the parity distribution of the first HWtH service groups, the first graph (top left) reports the first 1 to 26 service groups, and the second (top right) the 27 to 52 service groups, showing the distribution week on week of the percentage output of pigs born alive by parity. Bottom left and right report the corresponding result for the completion of the production cycle (parity) at weaning. The oscillation, and variation in age distribution of the breeding females impacts the levels of efficiency of the subsequent physiological profile of the resulting weaned population cohorts from each service group.

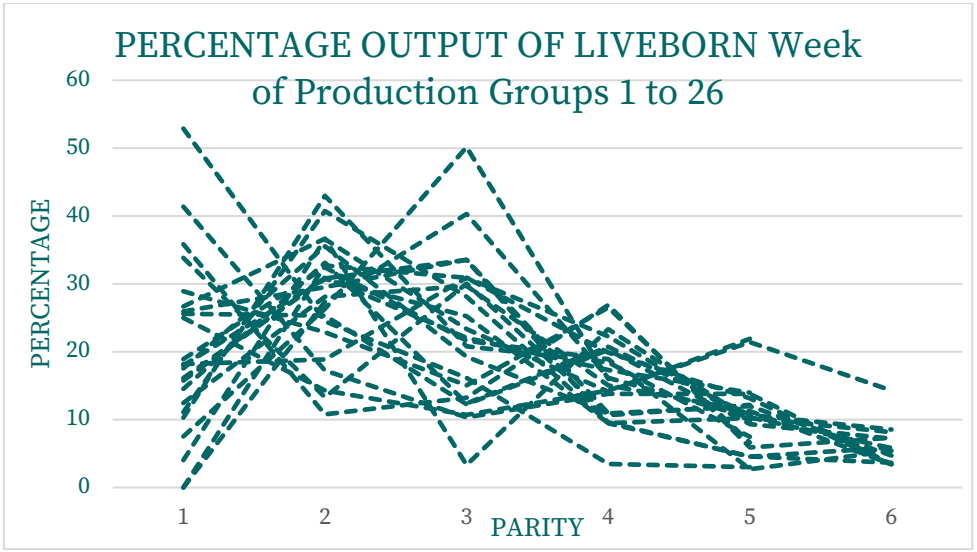
Understanding the accurate picture of distribution within any herd, that is available from within existing data in most pig recording systems today, unlocks the potential of process control to strategic husbandry. It is my experience that this creates opportunity for continuous improvement of efficiency in the context of a 3E strategy that concentrates understanding on the economic, ethical, and environmental challenges to industry responsibilities.

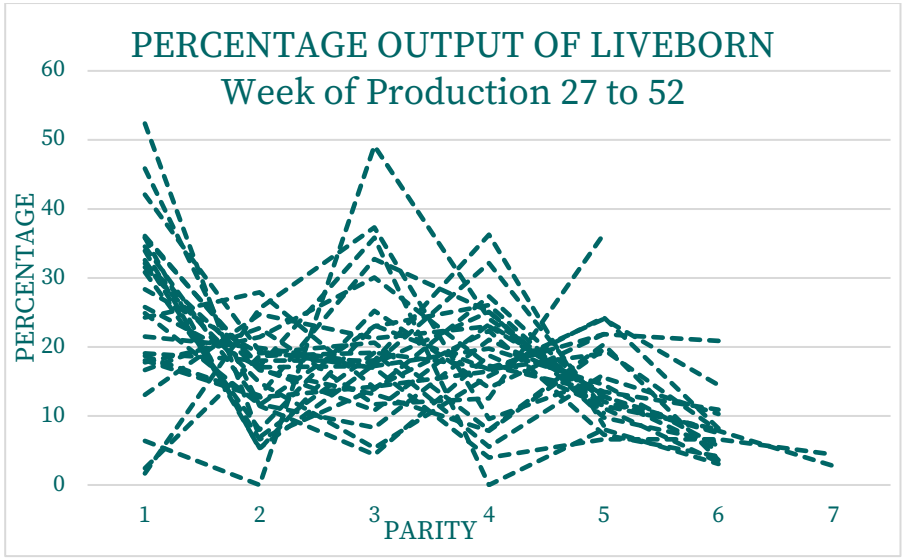
The graphs on page 5 are a common representation of the failure to manage replacement gilt selection and development, to anywhere near the full potential available in genetics today. The picture also demonstrates that feeding strategies are ham-strung (forgive the pun) by creating conflict for any attempt at precision. Animal health management is made to address an underlying status in a confusion of constant flux.

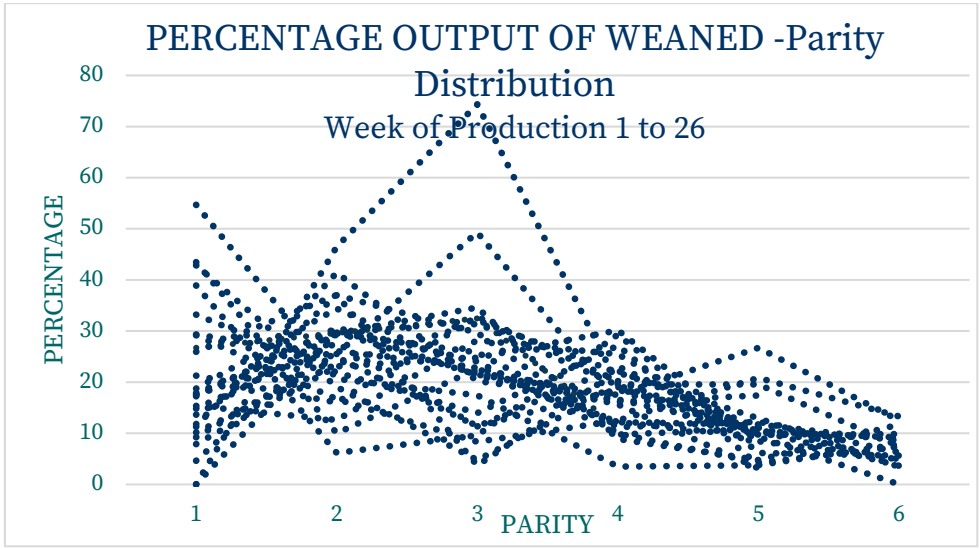
Page 5 is a collection of snapshots from within the spectrum of global pig production, every herd/business will be somewhere across this considerable distribution. It is a picture of compensatory parity distribution, the universal, non-strategic response to the potential of process control within production. We are just beginning to understand the possible, and many varied impacts of compensatory parity distribution as an elementary challenge to improving 3E outcomes. Not least the insidious drag it puts on the potential genetic expression of the feeding herd performance.

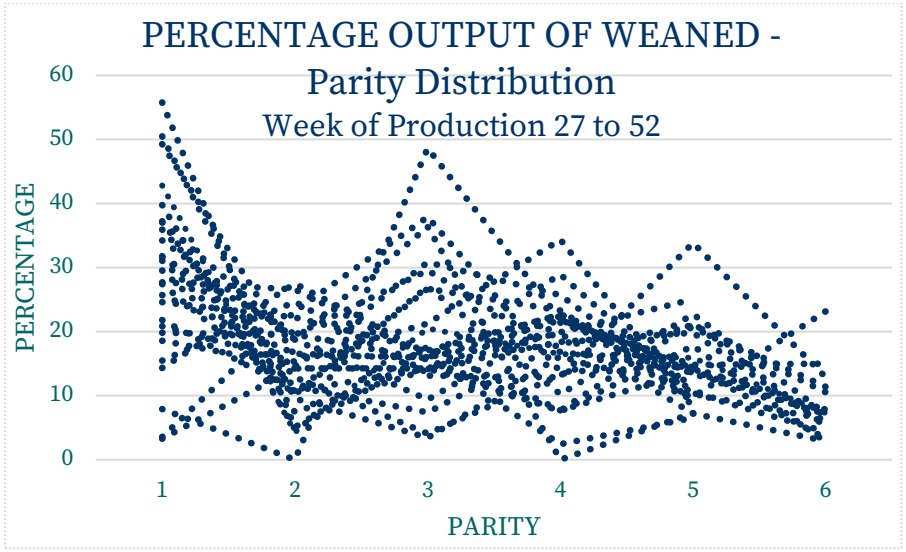
Compensatory parity distribution is rooted in poor replacement gilt management strategies, the responsibility is shared between breeding companies and their commercial production partners, pig farmers. It is currently evidenced in the emerging focus of breeding companies on sow longevity, and the bandying about of genotype/phenotype qualities such as ‘robustness’, and the concentration on the motor-mechanics of sow physiology. Sow longevity is not directly genetic by any stretch of the ‘science fiction’ imagination, it is the result of operational sow retention because of process control that begins at the conception of the designated replacement gilt. One of the roots of improving sow retention is to be discovered in the immediate postnatal management of litters across the parities, by reducing the variation that each lactating sow must contend with through the period they are raising the litter.

Variation is one of the elementary challenges of pig production, and should be considered fundamental in the development of strategic management programmes in operational pig production.


PERCENTAGE OUTPUT OF LIVEBORN Week of Production Groups 1 to 26
PERCENTAGE
PARITY
0
10
20
30
40
50
60
1
2
3
4
5
6


PERCENTAGE OUTPUT OF LIVEBORN Week of Production 27 to 52
PERCENTAGE
PARITY
0
10
20
30
40
50
60
1
2
3
4
5
6
7


PERCENTAGE OUTPUT OF WEANED -Parity Distribution
Week of Production 1 to 26
PERCENTAGE
PARITY
0
10
20
30
40
50
60
70
80
1
2
3
4
5
6

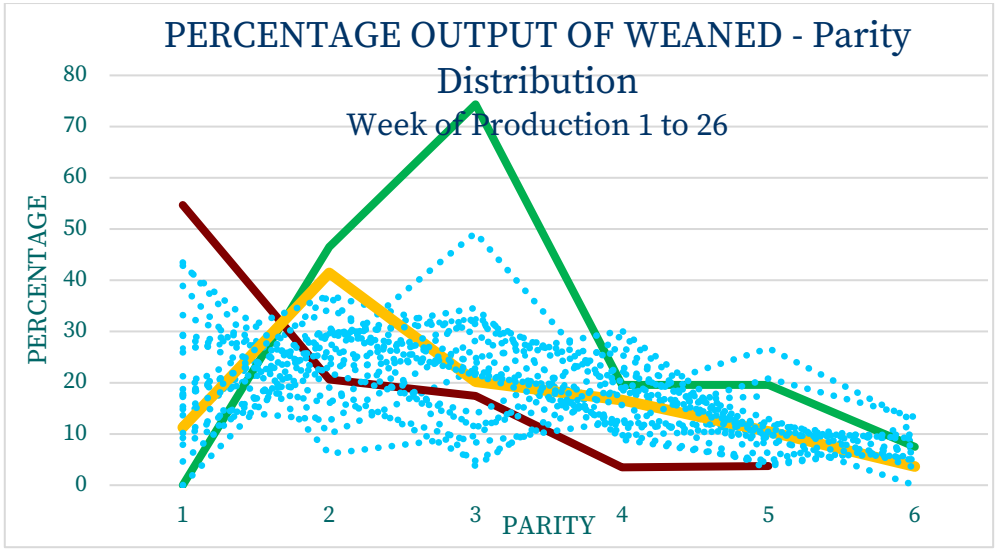

PERCENTAGE OUTPUT OF WEANED - Parity Distribution
Week of Production 27 to 52
PERCENTAGE
PARITY
0
10
20
30
40
50
60
1
2
3
4
5
6

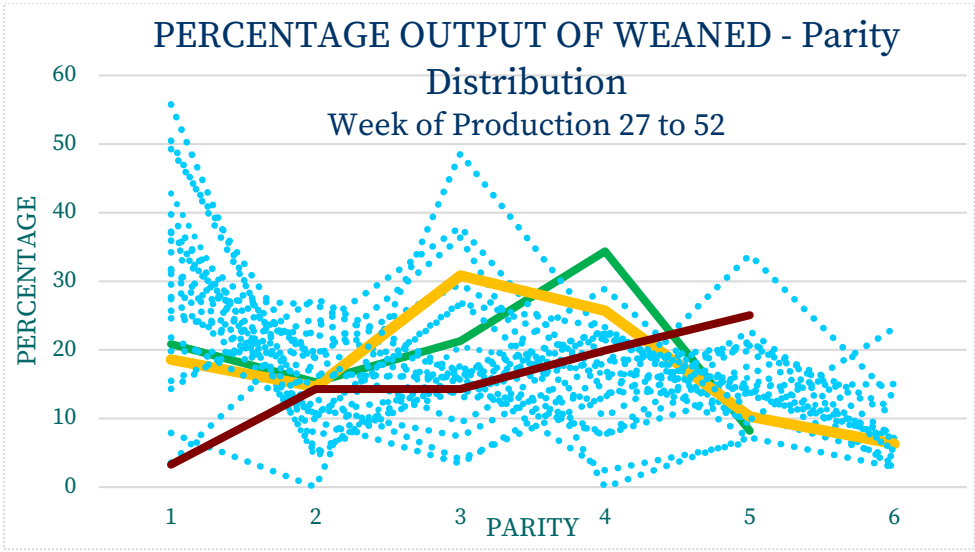
The next 4 graphs in the sequence (*page 6*) are two sets of 2. The first set top right and top left repeat the percentage output graphs for the weaned pigs result, highlighting the two extreme results, the best and the poorest, and the midway result for overall yield from the individual HWtH (service group). In the first graph (top left) the highest yield came from a parity distribution that had no parity 1 animals in production and three quarters of the entire group in parity 3. The distribution of this group next time in the next production cycle will have a 'hole' in output passing through parity 2 which will carry through for four more production cycles. The red highlighted line in this graph illustrates a counter profile in which more than more than half of the group entering at the start of the current production cycle that has just completed. In the second corresponding graph (top right) the response to the tight compression of most service groups at parity 5 at around just 10% of the distribution, a massive overload of replacement gilts beginning where it should be at around 25% but rising to 55% as an intake spectrum for the second half of the year.

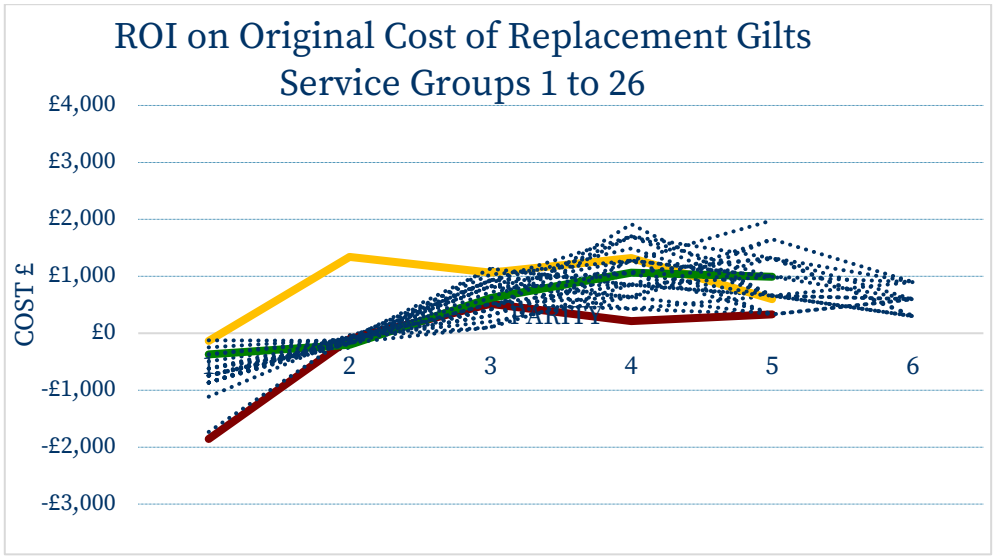
There is no evidence in the data of any strategic process control. The cull sows are 'pulling' the replacement gilts in rather than the replacement gilts driving the culls sows out. To take control, in what is a common management pattern, begins with planning ahead on replacement gilt requirements. This is done by producing a HWtH service group report that includes all the service groups in rotation in the herd, usually 21 for a weekly production system, 7 for a 3-week system, and 4 for a 5-week system. This report presents an ordered list of individual animals by parity and production index and enable the prediction of requirement for the beginning of the next production cycle of the group, based on either parity status or cumulative performance. As the herds within the herd come under greater process control it is possible to standardize the replacement gilt intake as the same for each rotating group.

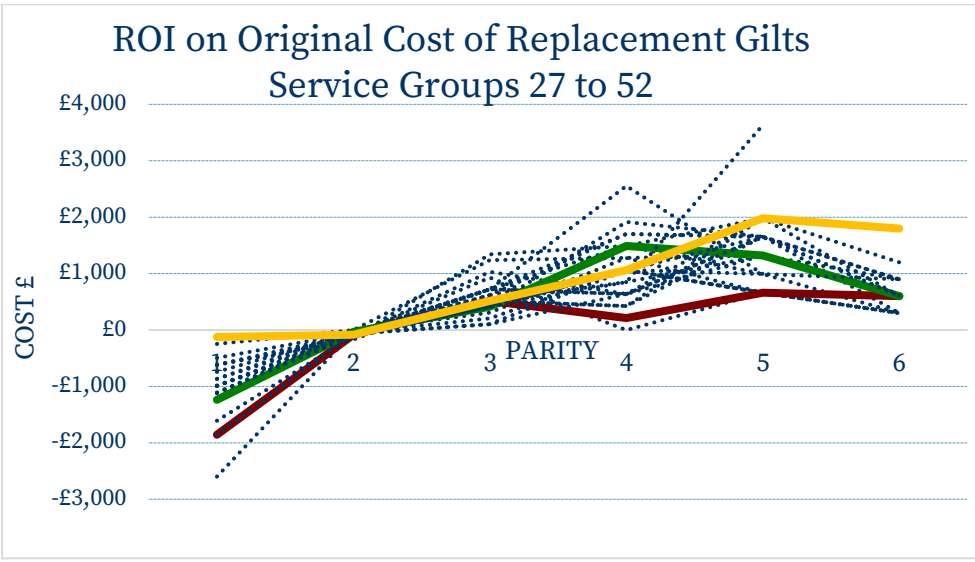
This strategic management of precision production will produce a very different set of graphic outcomes in comparison to what you see in this presentation. The operational outcome will become evident within the context of a 3E response across the economic, ethical, and environmental efficiencies.

The 2 graphs (bottom left and right) report the return on the investment made in the original intake in each service group of replacement gilts. This is cost modelled in this example to a reasonably average economic sample using the same colour coding to highlight the outlying and average results and can be specifically adjusted to the exact cost of any herd being analysed and reported by the One-Pig system used to produce this 'Words & Pictures' piece.


PERCENTAGE OUTPUT OF WEANED - Parity Distribution
Week of Production 1 to 26
PERCENTAGE
80
70
60
50
40
30
20
10
0
1
2
3
4
5
6
PARITY


PERCENTAGE OUTPUT OF WEANED - Parity Distribution
Week of Production 27 to 52
PERCENTAGE
60
50
40
30
20
10
0
1
2
3
4
5
6
PARITY


ROI on Original Cost of Replacement Gilts
Service Groups 1 to 26
COST £
£4,000
£3,000
£2,000
£1,000
£0
-£1,000
-£2,000
-£3,000
1
2
3
4
5
6
PARITY


ROI on Original Cost of Replacement Gilts
Service Groups 27 to 52
COST £
£4,000
£3,000
£2,000
£1,000
£0
-£1,000
-£2,000
-£3,000
1
2
3
4
5
6
PARITY

The final graph in the sequence illustrates the comparison between the percentage return on investment (ROI) in the original replacement gilts, and the total gross margin for pigs sold (all costs modelled as outlined above).

The data reports a profitable year, and within this the relationship between the specific economics of replacement gilt costs, and separately the gross margin returns to the parity distribution, as it is reported by individual service group analysed as 'herds within the herd'. The extent of process control intrinsic to the data sample presented in this piece is a reasonable mean of the universal spectrum of performance current to global production. The potential for improvement of sow retention across the global population, at the economic optimum parity 5 is, on average, around 30%. That is millions more sows and millions less replacement gilts. Food for thought?