Improving Productivity

Merrelyn Emery

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The Australian Treasurer Jim Chalmers recently announced that one of his key priorities for the next term of government would be improving productivity. A summit on the subject will be held on 19-21 August, 2025.

Now there are many ways to improve productivity in today's complicated world, e.g. adopting new more efficient technology, reducing or increasing regulation, adjusting tax schedules etc etc. There is one vital factor in productivity which is frequently overlooked and yet, it is at the heart of the very notion of productivity itself.

What is so frequently forgotten is that you do not get high productivity out of unhappy or turned off people. Whether this is expressed as frustrated, alienated, disengaged or a host of other words, it simply means those people have lost their motivation to go to work and do a good day's work: they are unmotivated. They are low on *intrinsic motivation*. Intrinsic motivation is that which is not dependent on external conditions such as pay and other incentives to work harder.

The concept of productivity was originally how much a person produced in a given period of time. It was measured as so much X per Y. With this simple definition, it is obvious that a person's motivation to work, to produce, was a crucial factor. A demotivated worker would be hard pressed to produce anywhere near as much as one who was eager to work and get things done.

As times rolled on and more complex conceptual and statistical ideas flourished, the factors going into definitions and measures of productivity became more complex. Including such factors as pay and conditions, worker skills and knowledge and health were early additions. In particular, as our various fads and fetishes with technologies developed rapidly, ideas about how to improve productivity came to have a heavy technological bias.

Today in the plethora of measures of productivity, intrinsic motivation has become a little lost.

Productivity, what are we talking about?

These days productivity is usually defined as some variant on the ratio of volume of outputs to volume of inputs. The two measures of labour productivity used by Wikipedia in its comparisons of nations are GNI per hour worked and GDP per hour worked (Wikipedia, 2022).

Labour productivity in 3 countries by 2 measures, 2022		
Country	*GNI per hour worked*	*GPD per hour worked*
Australia	75.6	78.9
Canada	70.9	71.9
Norway	119.3	161.8

This selection of countries shows that Australia's productivity is roughly comparable to that of a similar country, Canada, but a long way behind Norway. Norway is known as a country with a very high commitment to social justice and equality. Its labour laws include the criteria defining the conditions for productive activity, intrinsic motivation (Gustavsen, 1987). While we are roughly in the middle range of global productivity the figures for Norway show what can be achieved if sufficient attention is paid to the basics of work conditions and meeting human needs.

Historical labour productivity (GDP.p.h) in 3 countries where data normalized to zero in 2015				
Country	*1970*	*2010*	*2020*	*2022*
Australia	51.4	92.2	103.1	103.3
Canada	56.1	94.7	111.4	104.1
Norway	35.0	97.2	102.7	103.4

This table illustrates our improvement in productivity over time. Compared with the same 3 countries as in the table above, it shows that whereas our productivity before 2015 was relatively lacking, our improvement since 2015 has been much the same as Canada and the standout Norway as measured in absolute terms.

These data are not conclusive but raise questions about a dire need to concentrate on raising productivity at the moment or whether the summit could profitably be concerned with other matters. Alan Austin (2025) also concluded that there may not be a need to review productivity in Australia using quite different measures. The data presented below show that while some measures of productivity cast doubt on whether it is need of a rethink, **productivity would certainly be raised if we raised the level of intrinsic motivation**.

Intrinsic Motivation

The concept of intrinsic motivation has been around for a long time and was put on a full scientific basis by Emery & Thorsrud (1969). This original publication of the set of variables comprising the definition of intrinsic motivation was the result of cumulative investigations in Europe, Scandinavia, Australia, North America and India. These enabled social scientists to identify a number of important determinants of the psychological requirements of productive activity, located both in the dynamics of person-task relations and in the social climate of the organization.

Further work clarified the components which were put into a fully standardized and measurable form by Emery & Emery (1974). They were built into the design of a workshop, the Participative Design Workshop (PDW), in which employees redesign their own section of an organizational structure using the second genotypical design principle (Emery F, 1967) to achieve both high intrinsic motivation and high productivity.

This was necessary because it had become clear that organizations were being designed on the basis of economic and technical criteria only, ignoring the vital third, human dimension, precisely that which determines intrinsic motivation. They have now been shown to work in every country and culture in which they have been used.

The first three of these requirements which refer to the content of the work or activity need to be optimal for any given individual and flexible to meet variations in individual need; e.g., from day to day, or morning to afternoon.

1. *Adequate elbow room,* also sometimes called autonomy. The sense that they are their own bosses and that except in exceptional circumstances they do not have some boss breathing down their necks. Not too much elbow room that they just don't know what to do next.
2. *Continuous Learning*. We accept that such learning is possible only when people are able to:

- set goals that are reasonable challenges for them and
- get accurate feedback of results in time for them to correct their behaviour.

3. *An optimal level of variety*; i.e. they can vary the work so as to avoid boredom and fatigue and so as to gain the best advantages from settling into a satisfying rhythm of work.

The second three concern the climate or atmosphere of the work and the organization. They are things a person can never have enough of.

4. *Mutual support and respect*, i.e. the conditions where people get help and respect from their work mates without asking and vice versa. Avoiding conditions where it is in no one's interest to lift a finger to help another: where people are pitted against each other so that `one person's gain is another's loss': where the group interest denies the individual's capabilities or inabilities (as in the bull gang system that used to characterize Australian dock work and New Zealand's meat freezing works)

5. *Meaningfulness*, a sense of one's own work meaningfully contributing to social welfare. That is, not something that could as well be done by a trained monkey or an industrial robot machine or something that the society could probably be better served by not having it done or at least not having it done so shoddily. Meaningfulness includes:

- both the worth and quality of a product or service, and
- having a perception of the whole product, seeing the outcome

Many jobs which are meaningful in the first sense have been downgraded because individuals see only such a small part of the final product that its meaning is denied them

6. *A desirable future*. Put simply, not a dead-end job; but hopefully one with a career path which will continue to allow personal growth and an increase in skills and knowledge.

Experience over decades now has shown that these psychological requirements **cannot** be better met by simply fiddling with individual job specifications; e.g., job enlargement, rest pauses, better communication or supervisory communication. Improvement in the quality of the work is best achieved by locating responsibility, for *control* over effort and quality of personal work and for *coordination*, with the people who are actually doing the work, learning or planning. Control and coordination are the two critical variables in organizational structures which are governed by the genotypical design principles discussed below (Emery F, 1967).

You know when you walk into a workplace where people enjoy adequate to high levels of the 6 criteria, it looks cared for and the people are welcoming, proud of their work and their workplace, obviously enjoying the experience and excellent relationships with each other; the emotional tone is highly positive, one of energy and vitality. High intrinsic motivation shows and by using the PDW, it is not difficult to produce for everybody in the organization.

Measuring intrinsic motivation.

There is a reliable system of measurement of these 6 criteria which again has been tested and applied over decades. While we do not have a global measure of intrinsic motivation, we do have a solid database collected from 8 organizations in Australia and one in Canada over the last twenty years or so. We also have records of productivity increases in organizations which have changed their design principle to achieve high intrinsic motivation as below.

The organizations on our database range from heavy industrial to not for profit welfare to national public service. Size ranges from about 30 up to thousands. The base consists of records from 1182 individuals but not all the organizations measured all of the variables. Numbers very, therefore, in some analyses. However, all of the organizations measure the 6 criteria as these are recognized as essential indices not only of intrinsic motivation but also of general organizational health and performance.

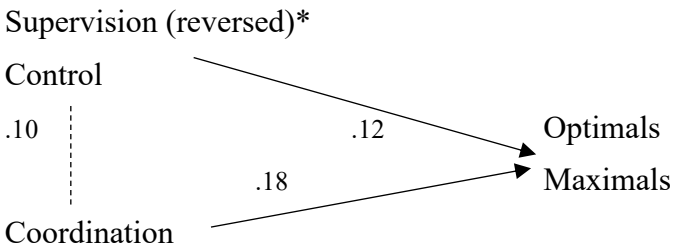
It should be noted here that these are 'before' measures, scores recorded as baseline measures against which change can be registered. The problem with this theoretical assumption is that once the change of design principle has taken place, these organizations are far from wanting to interrupt their workforce as they produce ever higher levels of goods and services. At best, they will publicize the rise in productivity, and profit, with their idiosyncratic measures.

The first three criteria need to be optimal for every individual and are, therefore, measured from -5 far too little to 0 just right to +5 far too much. We will refer to these as the Optimals. The second set of criteria are factors which exist in the climate of the organization and which people can never have too much of. We measure them from 0 none to 10 heaps. We will refer to them as the Maximals.

As outlined above, we know now exactly how to improve scores on the 6 criteria: the critical variable is the location of responsibility for coordination and control. This is determined by the genotypical design principle governing the structure of the organization, in the first design principle (DP1) that responsibility is located at least one level above where the action is taking place. In the second design principle (DP2) responsibility for coordination and control is located with the people making the action. Rather than the hierarchy of unequal individuals given by DP1 because those above have the right and the responsibility to tell those below what to do and how to do it, DP2 produces a structure consisting of self managing groups of equals.

This means there is no point in simply publishing average scores for the 6 criteria or intrinsic motivation as the set of criteria as those scores miss the crucial dynamics operating in the two types of structure. In our database the design principles are captured by the measure of closeness of supervision if any, the extent to which a person controls their own work and how often an individual coordinates their work with the rest of the team or section. In our database these three variables are causally related as shown below:

In this iteration of the zero order matrix, we see that supervision reversed combined with control, and coordination both contribute significantly to both the optimal and maximal criteria. There is also a secondary relationship between coordination and the combined supervision and control.



*Supervision is reversed as it has inverse relationships with both control and coordination as you would expect.

Using the three variables that provide a working measure of the design principles we can get a more detailed picture of the determination of intrinsic motivation. All three of supervision, control and coordination show an identical pattern but perhaps control is the most clear cut.

Crosstab for low and high controls and Optimals*		
	Low control	*High control*
Optimal low	14	32
Optimal high	10	56

*For both tables, low control are scores 1 and 2, high control are scores 6 and 7. For both Optimals and Maximals, low are scores lower than half a standard deviation below the mean and high are scores higher than half a standard deviation above the mean.

X^2 =3.75, d.f. =1, n.s.

Crosstab for low and high controls and Maximals*		
	Low control	*High control*
Maximal low	25	31
Maximal high	1	88

X^2 =41.2, .d.f.=1, p<.001

In both cases of the Optimal and Maximal sets of criteria we see that there is a pattern of high control producing much higher scores than low control. Low control also produces more low than high criteria although the chi squared for the Optimal set just misses significance. These figures demonstrate that structure is indeed a determining factor in intrinsic motivation.

One other significant outcome of changing the design principle through the PDW is that the pay system is changed to pay for skills and knowledge held. This has the effect of reducing financial inequality as while some managers may have unjustifiably high salaries in terms of skills and knowledge, the personnel who eventually replace them are paid on the new system. (These high salaries remain in the short term because of the 'no going backwards' rule.)

The other results below from other organizations over much longer time periods and different industries demonstrate that changing the design principle from DP1 to DP2 not only

increases intrinsic motivation but also directly increases productivity no matter how it is measured with different technologies.

Intrinsic motivation and productivity

The following sample of organizations realizing increases in productivity and reduced costs as a result of increased intrinsic motivation through a change in design principle are separate from those organizations listed on our database. Each organization has chosen their own factors to measure changes in productivity as they are relevant to their purposes, technologies and products.

- UK coalfields, – natural experiment where management brought in new technology which cut across and destroyed the traditional social system composed of self managing groups which had provided all their psychological requirements. Contrary to expectations, productivity decreased and there was a rash of mental health problems. Researchers worked with the men to restore the old social system, thus restoring health and productivity. This famous experiment is known as the birth of *sociotechnical systems* (Trist & Bamforth, 1951.)

The next selection comes from the four sites in the Norwegian industrial democracy program in the 1960s (Emery & Thorsrud, 1976).

- Christiana Spigerverk - wire drawing. Productivity increased 20%
- NOBO - metal fabrication. Productivity increased 20% in first 10 weeks with a further 10% in next 2 years. Turnover & absenteeism fell below average for the industry.
- Hunsfos - pulp & paper. Quality for averaged week and batch over 2 years ranged from 100% in first 6 months to 145% after that. Costs decreased with improvements from 3.8% to 15.8%.
- Norsk Hydro - fertilizers. Manning levels fell from 94 to 57. Production increase for each of the 3 main lines ranged between 50% & 100%. Down time before was between 10-30%. After was 5-10%.

The next set comes from Australia and Canada from 1970 onwards

- Department of Overseas Trade personnel office: error rates dropped from an average of 40% per pay to 3% (Gorrie, 1975).
- Commonwealth Industrial Gases: the number of gas cylinders produced per man hour increased from 0.6 to 1.7 (Roberts, 1995)
- Karadoc Winery: Productivity increased 7% in first year. Inventories fell from 4 weeks to 10 days for casks and from 2 months to 4-5 weeks for bottles. Improvements in efficiencies and waste reduction were around 28% and 38% respectively, and customer complaints about packaging fell by about 14%. There was a reduction of lost time injuries down from 2,000-3,000 hours per year to 20-30 hours per year over a 10 year period (Aughton et al, 1997).
- Syncrude Canada Ltd used PDWs to secure its future by reducing the cost of a barrel of its light sweet synthetic crude to a cost competitive with the traditional product. During the 1980s, they had tried sociotechnical analysis and design as practised in the United States (STS). Management felt it took too long, was too expensive and too difficult to implement as workers rejected the design and remained negative despite extensive human relations training. An internal action research team of 5 fulltime members and 3 part time associates began work with PDWs in 1992. Between 1989 and 1995, production increased by 37%, productivity per person increased 76% and revenue increased 50%. At the same time, operating costs dropped 20% and the workforce of

originally over 4000 dropped by 22% (Purser & Cabana, 1998, p. 272). There were no major technical changes during this period with only minimal sustaining capital injection. By 1997 productivity and revenue had increased even more while costs and workforce had further reduced convincing owners and new investors to commit over $2.5billion in new capital (deGuerre, 2000, p. 657).

- More recently, J Robins & Sons a 100-year old fashion shoe manufacturer, changed its design principle from DP1 to DP2 using PDWs. Over 5 years, total stock has reduced by 50% resulting in increased investment in new technology, lead time has reduced from 15 days to 2 hours, customer returns have reduced by 45%, downtime has reduced by 65% and pairs produced per person has increased by 30%. While they have faced challenges over the 5 years, they are the sole remaining large footwear manufacturer left in Australia. They compete with India and China and have not shifted jobs offshore. Absenteeism has dropped from 4 to 1.5% (Aughton & Butt, 2007).
- At the Queensland manufacturing plant of Dyno Nobel, now part of Incitec Pivot, previous attempt by management to set up teams had failed. Survey results showed 30% of employees were bored, rarely felt interested, excited, joyful, energetic or creative. The causal path analysis showed that organizational factors directly under management control alone were contributing to these indices of poor mental health, plus low motivation and low productivity. Management agreed to allow employees to redesign the plant to a structures based on self managing groups and within 6 months they had achieved the following outcomes:

  -worked out a way to immediately increase overall production by more than 12% without capital expenditure. They did this at the same they eliminated most overtime, thus bringing costs down to be competitive with imports from China.

  -an independent engagement survey showed employee engagement had improved by 81%

  -three operational management positions which became vacant during the project were not replaced. The teams incorporated the former management responsibilities into the teams which included shift production planning and breakdown maintenance (Aughton, 2008a).
- Telstra had been working with Qantas as its telco but had not been delivering what Qantas required which was extremely complex. Telstra had to radically improve its services. After a carefully designed process using OST's flexible methods, Telstra set up the Qantas Care Team (QCT) and won Qantas' preferred supplier award. The QCT achieved 100% service availability for all capital cities, i.e. airports and reservation centres over 12 months. The service task included 124 individual sites, 450 Cisco devices, 30Nortel devices and the coordination of the technologies and related personnel/silos of FR/ATM/SDH/DDN/ISDN (Aughton, 2008b).

They are only examples of many organizations that have recorded profound positive changes after moving from DP1 to DP2. However, many of these organizations report their success only informally if at all.

A note on engagement

While it is true that managers rabbit on about our workers are the most important factor in our business, this is rarely the case in practice. Dominant hierarchy (DP1) is the most common form of structure where those above have the right and the responsibility to tell those below what to do and how to do it. This totally ignores, defies the fact that people are

purposeful systems (Ackoff & Emery, 1972) who are built to make their own decisions. When constantly denied the right to make their own decisions in this way, people become frustrated and ultimately revert to various strategies such as fight or flight. The first casualty is intrinsic motivation followed closely by productivity

Another regressive step has been the rush into terms like 'engagement', a term created by William A Kahn. The original study (Kahn, 1990) was conducted on summer camp counsellors and an architectural firm. The premise was that people use varying degrees of themselves at work so the studies explored the conditions under which people engaged or disengaged themselves, where engage means express or employ themselves and disengage means withdraw and defend their personal selves.

The study found three psychological conditions relevant, meaningfulness, safety and availability. Only meaningfulness is a component of intrinsic motivation

This study did not use or mention any of the foundation work of Emery, Trist, Thorsrud or any of the Tavistock or Norwegian teams who had been pursuing the most desirable conditions of work for human beings since 1951 (Trist & Bamforth), which saw the birth of the concept of sociotechnical systems. By 1990, a huge amount of research had already established the need for a jointly optimized sociotechncial approach for the 6 criteria as above, high quality work and productivity and the genotypical design principles (Emery, 1967). The successful Norwegian Industrial Democracy program (Emery & Thorsrud, 1976) confirmed that the 6 criteria, intrinsic motivation, was essential to the alternative to autocracy in the workplace. Kahn did not find it necessary to directly draw upon this huge body of work.

Since 1990, engagement has become fashionable and there are nearly as many definitions of, and ways of measuring 'engagement' as there are management consultants. Here is a sample of the definitions and measurement of engagement:

Definition of engagement

- Emotional commitment the employee has to the organization and its goals. They show discretionary effort (Kruse, 2012):
- The involvement and enthusiasm of employee in their work and workplaces (Gallup, 2025)
- Invested in their jobs, bring a level of energy, creativity and drive. (talentcards).
- Extent to which employees feel a passionate connection to their organization, are committed to their work and put in the extra effort. (Verlinden, 2025).
- Loyal, committed, highly productive, better retention (Software Suggest)

Measurement of engagement

- An annual engagement survey, focus groups, eNPS (Silsbee, 2022)
- Turnover/retention, satisfaction, absenteeism, eNPS, promotion rate, productivity metrics, quality of work and innovation (Software Suggest).
- Voluntary employee turnover/retention, absenteeism, satisfaction, performance, eNPS, glassdoor.com, ROI on employee engagement, customer happiness, UWES and Gallup scales (Vulpen, 2025).

Obviously one of the most popular methods is to conduct an annual employee engagement survey which begs the question then of what goes into an engagement survey. The answers here are as variable as the definitions.

- Pathways Australia lists 8 elements: organizational culture and values, communication, leadership and management, professional growth and development, job satisfaction and worklife balance, recognition and remuneration, team dynamics and collaboration, client relationships (Pathways Australia, nd).
- Gallup says an organization must measure employee perspectives on the most crucial elements of its workplace culture (Gallup, 2025). This of course then begs the question of how an organization decides what the most crucial elements of its culture are.
- Quantum Workplace offers a survey design you can trust with a scientifically validated e9model: 3-pronged model with 9 tested questions that measure engagement levels, research backed questions: specific questions help you understand how to drive engagement, 6 point agreement scale: standard survey measurement improves the quality of your survey stats, integrated, open ended questions: survey questions to easily collect tangible examples of what to start, stop or continue (Quantum Workplace, n.d.).

In Summary

I could not find two sources with the same definition of engagement or the same way of measuring it. It is another case of *science by noun* or as Lewis Carroll would have it, it is meaning according to Humpty Dumpty. As a consequence, engagement suffers from conceptual fragility.

The concept of engagement bears little or no relation to intrinsic motivation as many measures of engagement do not include any measures of intrinsic motivation or include only one of the 6 criteria. Nor does it share its rigorous conceptualization or measurement. It is not a reliable substitute for intrinsic motivation. It is more a source of variability than validity as it lacks a solid theoretical foundation and as a result of this, its practitioners have no clear or reliable idea of how to improve it. It is every consultant for themselves. Making change on the basis of this concept can only be hit or miss.

Conclusion

Intrinsic motivation is a tried and true component of organizational performance and productivity. It has a solid theoretical as well as practical foundation with standardized protocols and measures. Well documented increases of productivity following a change of design principle with consequent increases in intrinsic motivation go back over 70 years in different countries and cultures. The method for making this change is simple and efficient with multiple benefits for employees and organizational performance alike.

Engagement cannot be a substitute for intrinsic motivation and its relationships to productivity are unreliable.

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