

The return on New Zealand's annual education investment, of an average \$ 8,000 per student (relative to GDP per capita - OECD) across 3500 schools produces a dividend of 1% to 2% "growth".

"These circumstances should not be a surprise. A foundation layer of 'Innovation' is at odds with the New Zealand's supporting education paradigm."

Paul McClean

How effective is the Industry-education system? 2014

INTRODUCTION

Global innovation data suggests competitive strategies, which have dominated New Zealand commercial practice for at least the last two decades, are having a weakening effect across today's global economies. In the same vein, many educational institutions, who are responsible for educating future mind-sets and innovators, are struggling to implement relevant 21st Century programmes, favouring nostalgic roll development "strategy", yet not as a means to innovate.

Unsurprisingly, New Zealand's "growth" remains largely made up of a dominant dairy export proposition and inbound income generated as a tourist destination with ICT outputs featuring as just 3% of exported GDP.

CIRCUMSTANCES

With over \$ 100bn invested in the socio-educational policy changes made in the early-mid 2000's upon NCEA, which generates New Zealand's talent and leaders out of all schools, now produces a dividend of 1% to 2% of "growth" (competing for a share of dairy pricing and tourist trade) the government's prophetic promises, at the time, now seem esoteric. Thus, it is a daunting predicament noting New Zealand competes with a flattening 0.21% portion of an increasing gross world product (GWP); underpinned by chronic skills shortages (particularly in the tech sectors), plummeting PISA educational scorings and

low human capital outputs (World Intellectual Property Index), across all categories. Indeed, with an 8 year lag before any change effect, should it ever occur, is felt between educational policy and output, these policies have simply preserved the prevailing industrial revolution education system rather than forming as a bedrock for innovation development.

The OECD and Global Innovation index cite factors as a growing digital innovation divide between the relevancies of a countries underlying education-industry system(s), as a supply line for Innovation, compared to countries who are not focused purely on their primary industries. Specifically, the Global Innovation Index say these factors are symbolic of countries with deeply fragmented, calcified, legacy or no apparent innovation eco systems versus rapidly emerging economies, not limited to Brazil, India, China and Russia. Spot the irony.

Contextually, New Zealand's tertiary education sector falters amongst the world University quality and achievement rankings. The effect links to New Zealand being the country, aside from Qatar, with the steepest decline, from 13th to 18th out of the top 30 countries on the 142 country World Intellectual Property-Global Innovation Index, over the recent 3 year period; with extremely low scores across most of the human capital output categories. Australia with an opposite trend,

replaced New Zealand in the same year it scrapped its carbon tax due to the impacts upon the economy following New Zealand's 4th year operating its emissions tax, which imposes costs, prohibiting innovation and productivity.

In contrast, emergent countries that have succeeded in establishing strong innovation socio-educational cultures, and have also embraced qualitative success factors— they have developed coherent linkages between their institutional strategies and capabilities, across all layers of the system and nurture an environment that supports innovation. Thus, transforming New Zealand's industrial-education system is a complex yet, important problem that is no less surmountable when knowing today's marketplace is characterised by rapid and multidimensional change.

	2012	2013	2014
Switzerland	1(0) —	1(0) —	1(0) —
Sweden	2(0) —	2(0) —	3(1) ▼
Singapore	3(0) —	8(5) ▼	7(-1) ▲
Finland	4(-1) ▲	6(2) ▼	4(-2) ▲
United Kingdom	5(-5) ▲	3(-2) ▲	2(-1) ▲
Netherlands	6(-3) ▲	4(-2) ▲	5(1) ▼
Denmark	7(1) ▼	9(2) ▼	8(-1) ▲
Hong Kong (China)	8(4) ▼	7(-1) ▲	10(3) ▼
Ireland	9(-4) ▲	10(1) ▼	11(1) ▼
United States of America	10(3) ▼	5(-5) ▲	6(1) ▼
Luxembourg	11(-6) ▲	12(1) ▼	9(-3) ▲
Canada	12(4) ▼	11(-1) ▲	12(1) ▼
New Zealand	13(-2) ▲	17(4) ▼	18(1) ▼
Norway	14(-4) ▲	16(2) ▼	14(-2) ▲
Germany	15(3) ▼	15(0) —	13(-2) ▲
Malta	16(16) ▼	24(8) ▼	25(1) ▼
Israel	17(3) ▼	14(-3) ▲	15(1) ▼
Iceland	18(7) ▼	13(-5) ▲	19(6) ▼
Estonia	19(-4) ▲	25(6) ▼	24(-1) ▲
Belgium	20(-4) ▲	21(1) ▼	23(2) ▼
Australia	23(2) ▼	19(-4) ▲	17(-2) ▲
Korea, Republic	21(5) ▼	18(-3) ▲	16(-2) ▲
Austria	22(3) ▼	23(1) ▼	20(-3) ▲
France	24(2) ▼	20(-4) ▲	22(2) ▼
Japan	25(5) ▼	22(-3) ▲	21(-1) ▲
Hungary	31(6) ▼	31(0) —	35(4) ▼
Qatar	33(7) ▼	43(10) ▼	47(4) ▼
Czech Republic	27(0) —	28(1) ▼	26(-2) ▲
Cyprus	28(0) —	27(-1) ▲	30(3) ▼
China	34(5) ▼	35(1) ▼	29(-6) ▲
Slovenia	26(-4) ▲	30(4) ▼	28(-2) ▲
Spain	29(29) ▼	26(-3) ▲	27(1) ▼
Latvia	30(30) ▼	33(3) ▼	34(1) ▼

Table 1 - Global Innovation Index Rankings 2012 - 2014

Upon inspection, low tech sector outputs and exports, as one factor of these circumstances in New Zealand should not be a surprise. A foundation layer of "Innovation" development simply does not exist in New Zealand's

supporting education system. This is because legacy, hierarchical and silo-based approaches towards strategy development pervade all layers of thinking found in the government, industry and education system(s).

"Innovation" strategy is often muted in to appease the electorate and is "sometimes" enacted however, the context, process and circumstances within which strategy is defined, and placed, lacks 'whole of system' systems thinking, coherence and interconnectedness. When unpacked, the cascading effects of most policies, which achieve funding with low risk, narrow visions, are found not to factor any analysis, or systems thinking alignment to the actual interconnected nature of the whole of system concern.

As a result, regurgitating the same tired policies serves only to develop a view that entrusting upon the illusion of success, is elusive. Recent examples include New Zealand government injecting near \$ 800 m, in 2015 of risk capital on education programmes that compound the symptoms of the previous governments, NCEA paradigm. Examples include the IES programme and the ICT Graduate schools, both of which fundamentally squander funds in failing to address the issue of legacy and the industrial revolution system; a perilous endeavour compounding the problem, while rest of the world moves on. The education system, which is the base platform for New Zealand's future, therefore, is not geared as a connected part of the system for innovation. In contrast, the countries that have succeeded in establishing strong innovation socio-educational cultures have also embraced qualitative success factors— they have developed coherent linkages between their strategies and capabilities, and they nurture an environment that supports innovation.

DEEPER THINKING

Many education institutions are free to act as standalone institutions however, the nature of the education funding model prohibits innovation collaboration. Schools are

forced to adopt inter-school competitive strategy as a means to safeguard their share of volume based education investment (by improving roll count). This activity is marketed using past academic successes as the drive to entice future mindsets (to build roll, to obtain increased funding) rather than reorientation of their strategy intent in promoting their capabilities for future mindset development.

Future generations may rightly complain about the morality of today's education strategy, at all levels of the system, in intergenerational terms. This is posed in terms of whether or not today's policy makers have seized upon the incredible opportunities presented by a digital era in terms of putting forward credible innovation foundations for societal wellbeing, tomorrow. As an example, although government is dense with consultants and experts, also in the Ministry of "Innovation" and "Education" (notwithstanding both operate as disconnected silo's), little changes appear to be made to address the educational-innovation strategy, or debilitating teacher-pupil spend or ratios occur in light of forward thinking innovation system.

Rare pockets of digital enablement does exist only in the mode of the current education system. However, without a strategic systems approach, many institutions ultimately operate parsimonious innovation activities *or* gravitate back towards the nostalgic transactional sorting of low end student performance and or when "it all gets too hard". This is because the shift in strategic choice, towards truly transformative philosophies or innovative, relevant, reality based, creative, learning, the foundation of forward thinking innovation, is deeply complex. The magnitude of transformation, even if acknowledged as necessary, often fundamentally disturbs the underlying beliefs which are shackled to a resistant system.

As a result, transforming education programmes towards a strong external environment connectedness is often

perceived to be costly and or locating transformation expertise, tremendously difficult.

As one several examples explained later, *shifting* from instructional education to project based learning, which leading educators say generate a rich plethora of creative, thinking and practical real world skills for students (as skills required for entrants to thrive in a project based industry world), is at conflict with the status quo. This is because front line "educators" are performance managed on their ability to churn out low quality standards based assessment where instructional delivery repels the threat, to the status quo, of the nexus of Innovation breaking out; that being applied creative thinking and problem solving.

PISA's (OECD's Programme for International Student Assessment), 2012, focused on 15 year old education, is a stunning indictment to the situation. New Zealand plummeted from 7th to 13th in the world for reading, 7th to 18th in science and 13th to 22nd in Math's, the crux of problem solving.

PERSPECTIVE

Corporate involvement in education is, by and large, often rejected by arguments of profitisation (rightly or wrongly) or social exploitation by defenders of the status quo. This can be seen through and cause political tensions in the system which exasperate the problem.

Devoid of risk evaluation or analysis regarding the robustness of the connections to the interests of developing future mindsets, Unions, extract and pour vast amounts of money into political campaigns that oppose educator accountability as they have vested interests in preserving their own longevity. Without careful educational application, the [NCEA credentials and framework drives a dangerous social and socio-economic precedent as it demonises competition in adolescent classroom settings.](#)

The implications of NCEA risks creating long term psychological dangers for social and life development, in

those that it qualifies, across an ever diminishing supply of inadequately skilled secondary school students who enter tertiary or industry, as New Zealand's Innovation supply line. The frequent claim is that NCEA under-prepares and creates poor work ethics.

Remarkably and compounding matters however, education officials self-aggrandize the quality of New Zealand's education performance. They say the system is "internationally leading edge" in terms of batch processing students towards NCEA qualifications which offer little but, low end thinking, low quality, and low comprehension "must get the credits" attainment. Thus, the general practice, using the NCEA framework (in its widely adopted form, but not as it was designed), offers limited opportunity for students to think, act digitally and "create" in any meaningful capacity.

Arguably, Education Ministries aligned with Innovation Ministries, at the very least, would seem the logical place to adopt a whole of system perspective towards creativity however, bureaucracy does not work that way. It would be career limiting for any bureaucrat to raise his/ her head above a parapet to swim against the tide of deeply entrenched, "traditional", hierarchy and layers of calcified management, proclaiming a better way that is not easy to envision or see; regardless of any notion of common sense.

SUMMARY

It is evident, therefore, that New Zealand's industrial-education system blindly preserves its alarming drift to international circumstances while emerging nations lavish the spoils of transformation in a globally rich digital era. The "system" is also, therefore, not listening to the loud calls from New Zealand's local industry. Firms are looking to innovate and crying out, on mass, for digitally savvy, creatively minded innovation talent yet, repeatedly report on chronic skill shortages.

HOW CAN SYSTEMS THINKING HELP?

With a transforming digital era, emergent economies, led and leading by social phenomena, shifting demographics, transformative diversity, regenerative education approaches are urgently required to bolster a coherent, credible, long term, internationally robust, and globally relevant innovation strategy.

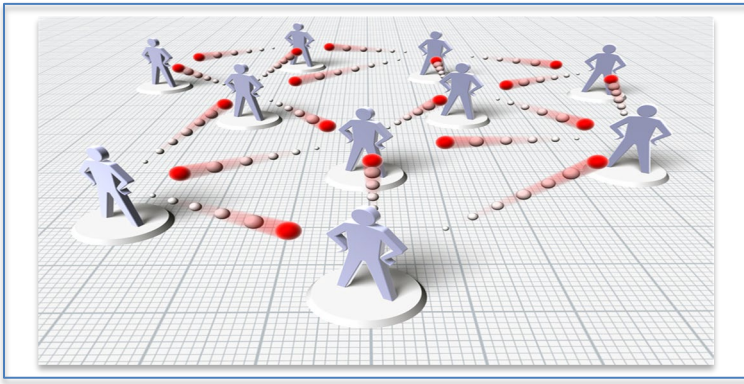
RELEVANCE

Governments are not good at transformation. Families, individuals, communities, organisations, education, industry and regions can no longer singularly rely upon governments as a provision for 21st Century education. This is because, as the data suggests, in a digitally transformational world, governments can hardly keep at pace themselves and assumes its own practitioners are equipped for recognising the need and for leading transformation.

Therefore, it is both the role and responsibility of "systems" aware industrial and educational organisations (and or front line practitioners) to regenerate the role and function of New Zealand industrial-education system.

Undoubtedly, underpinning system dynamics, the approach to show the value of transforming complex behavioural systems, is the means to unlock front line educator and industry mindsets, from ground up, by promoting and proving, upwardly, the use of systems thinking.

Systems based solutions are the means to tame a serious and complex problem, by helping many to see and engage in the big picture. Accordingly, Systems generated ideas enable organisations to address the questions of why to pursue a new direction. Systems dynamics enables organisations and practitioners to construct contextual programme architecture.



SYSTEMS TRANSFORMATION

Systems thinking enables industry-education partnerships to collaborate in regeneration of the industry-education system by revealing opportunities from a 'whole of system' innovation connectedness (about a globally connected digital eco system). Industries can no longer rely upon talent supply from the education system alone. Industry must play an active role in designing its own talent supply line through transformative education.

KEY FEATURES

The key features of a "systems" based industry- education transformation ought to include:

- 1: **Regenerating** the education's core philosophies, principles and system-wide strategies (at all levels); using system thinking, to map Innovation across all layers of a regenerating industry-education supply.
- 2: **Regenerate** education architecture to create, integrate and connect industry-to-in-classroom education, talent development, and project processes within all academic systems and sub-systems; to mitigate skill shortages, and or the effects of "brain drain", by increasing the throughput of highly skilled "thinking" and digitally savvy, proven industry-ready school students, into the tertiary and or industry system.

3: **Regenerate** the current education paradigm. Remodel the end to end academic syllabus by embedding 24/ 7 knowledge creation, rather than timetabled low end comprehension, as the "standard". Integrate digitally enabled, real world, project based, experiential learning, at all levels, all subjects. Removal of all political dogma and influences from the system, curriculum and practice.

4: To set in place a new wave of "**Knowledge Creation**" educational-industry practitioner who are able to sustain the regeneration of industry, and new socio-economic systems, at least a generation ahead – with emergent transformation strategy benefiting industry-education as an alternative or compliment to competitive strategy in both contexts.

5: **Developing** systems thinking skilled, higher order, digitally savvy, real world experienced, knowledge-creation and or innovation-centred, industry involved or experienced practitioners as new paradigm teacher/ educators: to and as a function of regenerating teacher entry, training and industry-centric curriculum with Innovation processes.

6: **Start again** with the decile and roll count funding models. Create education funding models as counterpoint or accountable to the agency of regional innovation, industry involvement and community development.

7: **Remodel** educator accountability and educator frameworks. Create incentives that generate a transformative heartbeat, within an industry-education eco system, driving purpose about education focused on long game knowledge creation, as a foundation for innovation quality, rather than celebrating low end academic churn.

8: **Connect** all layers as a coherent, enduring, managed, counter- anticipatory framework.

REALITY CHECK

Implementing profound transformation to the current, persistent, industry-education architecture involves contending with significant complexity; and involves driving consistent and pervasive degrees of transformation through all layers of interaction, focused on behavioural and philosophical change, within the “system”. No easy feat.

An entwinement of new industry and educational practices towards digital entrepreneurialism, employing system thinking, enables civically minded organisations and practitioners, both industry and education, to leverage their mutual capabilities.

The scale of the problem is as significant as the complexity involved in the fundamental transformation that is required. Because of this, such transformation must be a whole of system endeavour.

“Isolated professionals that interact solely with themselves or with their materials no longer make sense; rather what truly matters is the configuration of human groups that are in constant interaction through networks or communities. Therefore, it should come as no surprise that organisations are determinedly seeking how to foster collaborative processes and the development of the environments that facilitate them.” (Gairín, 2011)

9: **Transform** organisations, both industry and education, from their calcified, out of date, hierarchical, competitive, forms to “**learning organisations**”.

Learning organisations differentiates practice from traditional norms because they constantly reorganise structures to operate fundamentally different forms of strategic control suited to context. This is a form of social or societal construction or self-formation. By doing so

however, a learning organisation model enables **enactment strategy**, which is a form of directly (strategically) controlling the environment, to occur through interaction cycles rather than responding latently with stepped chunks of ‘guess’ strategy driven from the ‘top’. Thus, this type of connectedness must occur across diverse stakeholder groups, people, organisations improving internal/ external environment alignment strategy (visa vie strategic drift reconciliation), industries and agencies.

And then, this creates sizable advantages towards innovation, and considers an organisations own ability to design, create, shape and select environments by altering mind-sets to reshape relationships and behaviours. They are then able to make transformative decisions about the organisation’s domain of operation and control the organisations destiny accordingly. E.g. towards an era of knowledge creation.

By default, this shift scoops up changes with includes talent development processes, programme delivery models, departmental processes, process control, and business intelligence, and information technology.

This convergent transformation develops, and is emergent, and designed to reveal the value from an action based, systems thinking and dynamics approach that starts by “regenerating” the foundations of the industry-education system. As examples, systems approaches create and sustain genuine opportunity by teasing common societal problems for transformative and digital learning programmes to solve. This, in turn, develops long term innovation eco-systems and that are able to generate long game societal win-win outcomes.

This is a new form of strategic control that education in particular ought to consider. Learning organisations with enactment strategy empowers practitioners to shoulder collective accountability for managing the increased use of their systemic awareness and access to a greater array of facts. Thus, if they [organisational members] entrust that

they have the right mix of autonomy and ability to structure corrections, to the norm, they are better poised to engage in knowledge creation not deny its formation to preserve themselves; or the failures and implications of past education policy.

SUMMARY

In summing up, the starting point for creating a genuine globally connected, knowledge-creation, innovation argument [for New Zealand] is about putting into practice the hypothesis of regenerating the industry-education system. While organisations urgently require alternatives to competitive strategy, education needs to support industry with a new value proposition. Capacity, processes and innovation can only start with an urgent shift in the industry-education system, *away* from transactional sorting of low-end learning, value-less qualifications towards an industry-education, integrated, transformative, knowledge creation paradigm.

Paul McClean

