

WHEN AUSTRALIA INNOVATES, THE WORLD OF HEALTHCARE CHANGES



PERSPECTIVE SYNOPSIS:

There is a societal and economic imperative across Australia to address the fundamental challenges stifling innovation in the Australian healthcare environment. These challenges have a real impact across our community manifesting in an inability to continue the transformation of healthcare in meaningful ways for healthcare providers, clinicians and ultimately the Australian patients they serve. These barriers can be overcome. Now is the time to come together.

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THE CONTEXT: Australia's brewing economic and healthcare storm

Australia stands at the precipice between growth cycles.

Behind us are our glory days of our traditional economic strengths. As we look around us, we see the old industries of mass production and traditional heavy manufacturing being decimated.

Nation-wide, traditional manufacturing has declined in alarming ways. Textiles and farming are under threat. The auto-industry has all but disappeared. Even mining – the great magic pudding of Australia's recent economic history – is perilously placed.

“Traditional manufacturing has declined from 20% to 6% GDP in the last 30 years”

Even those areas of significant strength and value – from financial services to law, from consulting to media – seem increasingly under threat from automation, from AI, from new technologies.

From cars to clothes, from lawyers to farming to mining, the assets that marked out Australia's economic success are perilously placed and increasingly eroded. The gains from Fordism and even from computerisation of old processes are petering out.

Make no mistake – there is an economic revolution underway. Our economic future – uncertain at best – depends on not only leaping to a new economic paradigm, but first even imagining what that paradigm might look like. Where will tomorrow's jobs, tomorrow's careers, tomorrow's industries, come from?

Now all of this is both reflected in – and sharpened by – the healthcare

context. Faced with economic uncertainty – and seeking structural repair of public finances – governments have struggled to manage budget pressures – seeking new efficiencies. Including in healthcare.

But the task is not easy – the 'perfect storm' of escalating demand, increasing complexity and changing composition of population health needs has united with sharply rising expectations, shattered asymmetries of information and ever more urgent calls for a recalibration of some of the most fundamental relationships and power dynamics in our health system. New technologies and new information are empowering patients, consumers and carers like never before, adding weight to the burden of change born by our healthcare systems.

It is in this context that innovation in our healthcare system comes to the fore.

But to be honest – we've heard all of this before. For all the talk of innovation and sloganeering about disruption in healthcare, the structure, institutions, public policies and practices of our health system look alarmingly similar to the way that they did 10, 20, 30 years ago. But if we are to escape the eroding ground of the past and find new ways to revitalise our economic future, we must convert those slogans into something more.

THE MEDTECH OPPORTUNITY

So often we hear talk of the future of healthcare.

And while of course institutions, payment systems, government policy and health service management all matter to this future, it is nothing less than a bureaucratic fantasy to imagine that these things – alone

– will mark out the future of our healthcare systems.

If we peer into the recent history of some of the greatest strides forward in healthcare – what do we see?

We see antibiotics and vaccines. We see x-rays, MRIs and ultrasounds. We see keyhole surgery. We see the pacemaker and the bionic ear. In short – we see technology. So often, healthcare advances through resounding transformations in technical know-how and what we do with it.

And while new forms and dispersion of information are certainly making clear to us that the future of our healthcare will in important ways be digital this is far from the end of the story – technology has a far broader and grander role to play in our healthcare future. Devices, bionics, implantables – themselves sourcing and responding to information flows in real time open new vistas of possibility in terms of care personalisation, responsiveness and effectiveness.

And of course, medical technology (or MedTech) is not only a key engine of progress in our healthcare systems, but also for our economy more broadly. Globally, billions of dollars are flowing into MedTech firms – from immunological approaches to cancer, to bionics, to implantables.

“Global MedTech expected to hit US\$500B by 2020”

Now of course, Australia has historically enjoyed outstanding performance in MedTech innovation – think of the pacemaker or ultrasound. Or the bionic ear. Or the clinical useage of penicillin. Our universities and medical research institutes are the envy of the world. Our health systems are amongst the best anywhere. Investments into healthcare research through government initiatives (NHMRC, ARC, CSIRO etc.) run to \$3.4B annually.

As a nation, we are globally recognised for our advances in

medical research and discovery as demonstrated by the many thousands of publications accepted into peer-reviewed scientific journals annually.

“Australia ranks 8th out of 36 OECD+ countries in its contribution to the top 1 per cent of highly cited publications per million population”

But – for all of these strengths, for all of this storied history – why then does Australia perform so poorly in MedTech utilisation and commercialisation? While we are fourth for innovation, we are 29th (out of 30) for commercialisation and industry engagement. Our ventures struggle locally before fleeing internationally. For all of the public dollars that flow into medical research in this country – why do our health services remain relatively unchanged year after year, decade after decade? Simply put, why does Australia invest heavily in healthcare research when there is no mechanism (or structural incentive) in place to extract potential financial or lifesaving innovation dividends back to the nation – what’s the purpose?

We seem to be inhibiting rather than unleashing our potential in MedTech and innovation. And in doing so we leave economic gains on the table, and our duty to improve healthcare unfulfilled.

BARRIERS TO CHANGE

For all of the (reasonable) trepidation about our economic futures, we appear to be mired – stumped – by the status quo.

The forecasts for the next decade suggest that we are entering a technology revolution. This new era will provide new opportunities, deliver new applications across a multitude of industries, update old manufacturing practices, respond to consumer needs and solve the challenges associated with changing social and environmental landscapes.

But this can only be achieved through the successful adoption, translation and commercialisation of these emerging and enabling technologies. The significant value associated with such growth requires entrepreneurial leadership, capital injection and a sophisticated skill base.

In theory, Australia should be well placed to exploit and take advantage of the new emerging opportunities in MedTech given our industrial capability, extensive healthcare research foundations and relatively stable fiscal position.

In reality, the train of productivity improvement and deep-science based innovation has stalled. We now underperform with respect to commercialisation compared to our international competitors. Thus, Australia’s opportunity to exploit the nation’s research investments through technology translation into advanced manufactured commercial products is not being realised.

So what is going on? We venture a few thoughts:

ON THE BACK FOOT IN DEEP TECHNOLOGY

It is well recognised that deep-technology-based companies are a significant driver of economic growth, and many countries have responded by launching initiatives to stimulate this high-risk market gap and drive innovative mindsets. Australia is on the back-foot and has under-invested in catalysing and supporting deep-technology translation, as evidenced by the fact that we now have one of the lowest rates of IP based start-up formation in the world, and one of the lowest rates of venture capital investment.

Our governments and innovation players need to realise that innovation and entrepreneurship do not just mean ‘digital’. A pathological focus on digital, on fast wins and peripheral innovation - rather than on deep innovation – does not capitalise the obvious opportunity presented to our nation – and there lies the significant challenge.

FRAGMENTATION

The linked sets of sub-industries and players that make up our MedTech ecosystem – from universities to medical research institutes, from startups and entrepreneurs to investors, from incumbent corporates to governments, from product development companies to advanced manufacturing firms – are broad and vast.

But it is seldom the case that we recognise that breadth. Australia is weak on frameworks and policies that bring the whole of the ecosystem together. We are weak on all of the connective tissue that would defragment the system. We have limited institutional architecture that would drive coordination.

We fail to see the strengths of parts of the systems, and the interrelations between them that would drive the whole system onto a new growth path. For example – we seldom see and recognise the advanced manufacturing sector benefits that would flow from a vibrant MedTech commercialisation pathway. We often don't see or leverage the world-beating capability that lies in our local product development companies.

The fragmentation of our innovation system is mirrored in a sense by the fragmentation within our healthcare system. It is trite to say that the Federal-State dichotomy – and the spread of functions between the two levels of government – when combined with the division between public and private elements of the system creates challenges for policy development, for reform, for sharing costs and responsibilities. Integrated pathways, integrated outcomes and integrated value generation is hard to chase in such a balkanised context – a health system in which term 'system' is often more a label than it is a reality.

This too poses difficulties for MedTech – which often chases system value – reducing costs

across cycles of care, improving the outcomes generated across whole pathways rather than merely being assessable on an episode-by-episode basis. By missing the picture of the whole, we miss the true value that can be generated by MedTech.

As a result, we misalign incentives across the system and burden the wrong actors with the responsibility of driving change. We imagine that traditional actors within traditional organisations – be they universities, or corporates, or governments – can drive innovation.

We play competitive games across our ecosystem. We devolve into cabals and inter-system feuding. We construe our interests as narrowly as we construe our system.

We have made our nation into a supermarket of life science technology for the world's multinationals. Technology is sought and licenced overseas, while other nations benefit from Australian discoveries and inventions.

Our myopia is to our significant economic and healthcare detriment. The underlying risk aversion here limits short term financial and economic gains. But even more than this, we are starting also to see the longer-term disadvantages that this has brought our economy – as we now scramble to drive innovation and maintain the strength of our knowledge-based economy.

Our lack of foresight contributes to Australia's bottom-of-the-pile position on the OECD league for industry participation. We fail to see the whole of our system, and our collective – joint – responsibility in innovation and in bringing our economic and healthcare future to life.

TIME-TO-MARKET AND VALUE CAPTURE

Depending on the technology and regulatory requirements, time to market for MedTech is 3 to 7 years. However, it is seldom the case that interventions (be they public policy, institutional, or even investments)

take a sufficiently long view of MedTech to allow for the stimulation and stability that the sector needs to flourish.

The problem is essentially one of value capture. We pour money into medical research, but then fail to capture the economic or healthcare/patient value that could result from that basic investment.

LOW MULTINATIONAL ECOSYSTEM INVESTMENT

Global medical technology companies – multinational corporations with operations, markets, supply chains, insights and facilities across the planet – should be key players in any thriving MedTech ecosystem. It is they that have the connections, the routes to market, the know-how and the commercial capacity to stimulate and support MedTech innovation and commercialisation.

The presence of multinationals can stimulate the geographical agglomeration of companies, creating technological externalities and knowledge and productivity spillovers and positively influencing the technical, scientific, and managerial capabilities of local talent.

Moreover, research shows that multinational companies, through the creation of linkages with local suppliers, can exert positive effects on the development of indigenous firms in the host country. Coupled with foreign direct investment effects, this can stimulate the exporting activities of local firms, increase productivity and increase innovation. Human, organisational, and network capital can all grow through these positive feedback effects.

That said, multinationals in Australia have – in the main – failed to generate this stimulating effect on Australian MedTech. This is not to say that some global MedTech players are not trying to radically accelerate the local space – some are taking great and exciting strides. They are fighting hard against the constraints of difficult regulatory, policy and market conditions that can

make bringing products to market locally challenging.

That said, large proportions of the global MedTech community still take the easier, less dynamic approach to the Australian market. Many of the global MedTech giants in Australia tend to locate sales and marketing rather than research, innovation and development functions in Australia. They scout talent and IP – in part adding to the problem of making the country the world’s IP supermarket. They often do not play at the ecosystem level in MedTech – rather following narrow and short-term commercial interest where longer-term gain should be focused upon. The Australian MedTech giant remains in slumber – multinationals can help to wake it – to their great benefit, and to the benefit of the nation.

LOW RISK TOLERANCE

Australia has a very low risk tolerance for investment in early deep-tech startups – we tend to only support past (rather than future) success and ostracise failed innovative attempts. The fact is that failure is a reality and lessons learned should be shared.

This is of course the chicken and egg scenario, success breeds success and capital flows into regions of growth – radical thinking for incentives to enable early-stage capital are required, and perhaps not through traditional venture capital models in the first instance.

A compounding problem is the aggressive nature of capital markets that do not always suit early stage ventures. Venture capital firms in this country have a history of investing too early, attempting to realise value too early, and are themselves undergirded by a lower than optimal risk appetite for deep MedTech ventures. A rethinking of funding models that enable faster and easier access to capital (non-dilutive or convertible systems) that allow for increased growth, valuations and time to market may help venture capital players to play at the right

moment, and lower the associated risk for investment.

DATED REGULATORY FRAMEWORKS AND TIRED POLICY APPROACHES

In an effort to boost opportunity within the realms of innovation and entrepreneurship, governments seek programs aimed at claiming the next global innovation hub.

Creating new markets and sectors is hard. It is complex. Much is unknown. It takes policy ingenuity and courage. But too often, our policy interventions adopt well-worn but less-helpful paths. Too often, we see ‘copy-and-paste’ options. But what works overseas or in other sectors may not work here – Australia MedTech is unique with many factors not understood by our international comrades.

Perhaps worse are ‘program-regurgitations-with-a-new name’. What has never worked before is unlikely to work now...

Part of the problem is that there is far too little involvement of ecosystem players in policy design. A deep, vital, and enthusiastic pool of insight and assistance is out there, and stands ready to help governments design new, exciting and effective interventions in the MedTech commercialisation and innovation spaces. Drawing that talent into policy design is critical to future policy success.

A significant financial, clinical and manufacturing hurdle for any MedTech endeavour is the regulatory pathway and dealings with our TGA. The journey of gaining national regulatory approval is described by many as a long, winding nulabor trail, with limited direction and a strong headwind. Certainly, for Australian enterprises aiming to gain a home-grown-win, the TGA seems to create an arduous trail of paper-work, monotonous interctions and frames and models ill-suited to the cutting edge of the Australian MedTech economy.

While the TGA has fully acknowledged, its dated framework hinders the ecosystem, turning the ship has been slow, with only minor tweaks to-date. It has not yet aligned to the grand innovation plan of the nation – arguably it has barely been invited to the table. Lack of coherence across commercial and regulatory sectors hinders a national strategy of innovation and economic advancement.

The absence of real involvement – and genuine consultation and ‘governmental listening’ – to sectoral concerns and the lived experience of those in the MedTech ecosystem in policy design also results in the at times tragic removal (or contemplated removal) of those rare and key pieces of innovation architecture that really do work for the system. Think for example of the Victorian State Government’s now defunct Technology Voucher Program (TVP) – an outstanding piece of policy that helped many an emerging MedTech company access key skills and capabilities across the value network, while contributing to reducing the risk in securing further investment. Or contemplate the mooted changes to the Federal Government’s R&D Tax Concession – one of the few interventions that has given R&D-intensive enterprises a real opportunity to succeed, widely regarded by the innovation community as Australia’s key differentiator on the international innovation stage.

There are, however, glimmers of strategic leadership and genuine foresight in investment in this space. For example, NSW Medical Devices Fund is one successful direct model that has had consistent contribution to the MedTech startup community and is built on the basis of catapulting real NSW-based innovations.

We should be clear, however, that the challenge for governments in this space is not insignificant. While we can be confident that over the middle

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and longer term investment and attention paid to medical technology and innovation can act to reduce pressure on health budgets over time, the real hurdle is that MedTech is not a one-political cycle win. It takes time. Foresight is necessary. Gains require patience. In a time of 24 hour media cycles and retail politics the need is for governments to rise above the short-term and to turn their attentions – bravely – to the longer view.

THE CALL TO ACTION

But there is nothing about these barriers that cannot be overcome – they are of our making and we can shift them if we – together, with vision and purpose – choose to. As a nation, we should be coming together for what is clearly an incredible opportunity to simultaneously benefit our economy, and improve our healthcare.

There is clear willingness in our public and economic narrative to change, with players more and more echoing the right tune. However pace matters – and the time to act is upon us.

And how should we act?

1. As an ecosystem: We must leverage the scope, breadth and depth of the value network – bringing together academia, industry and government – in a coordinated effort to catapult our sector into a brighter future. We must combine the strengths and passions of academia, industry, funding partners, clinicians and governments. We must take account of the requirements and specialisation needed to take concept ideas through the innovation pipeline, and ensuring that the ecosystem is not only capable, but also coherent and connected.

2. With strong leadership: Australia's MedTech ecosystem has scale, but its global competitiveness demands greater coordination and collaboration. The nation needs a coordinated strategy and leadership for the MedTech sector to avoid

further fragmentation and division. With a lack of overarching direction, various entities are trying to second-guess what the government is thinking, making assumptions and seeking marginal value that erodes the capability and potential of the sector as a whole.

3. With moral purpose: We must recognise that there is a moral as well as an economic imperative in building the MedTech sector. Our focus should be on entrepreneurs and clinical-led activities, patients and industry-development, advanced manufacturing and care redesign, high value exports and high quality lives.

4. Driven by innovation: Innovation and entrepreneurship are at the heart of creating and developing our national MedTech ecosystem – and we must find ways to foster these skills – especially in the deep-science circles. Multinational corporations and startups matter here, but world-class SMEs are absolutely critical. Australia needs to coordinate a collaborative model that inspires and directs leadership across talent, investment and culture to build a modern, progressive MedTech ecosystem.

5. And right now: The future is upon us. The need to act collectively demands our attention. The ship is docked and getting ready to sail. The opportunity must not be neglected – for it may never return.

At the level of public policy, what might all of this mean?

Policy not programs: government interventions in the MedTech space could usefully become more widely focused on broader policy objectives and interventions rather than piecemeal, programmatic interventions. Rather than a series of relatively weakly-linked programs, a more coherent approach may be beneficial. In this, taking a 'pathways' or 'lifecycle' approach may be beneficial – in which policy interventions are designed around the experience and journey of firms, perhaps taking a core series of

journey-types, as explored in this report, as a starting point. In this way, policy resources can be directed to known slippage points in the commercialisation journey, improving targeting and the efficiency and effectiveness of interventions.

Simplicity and predictability rather than complexity and uncertainty:

A consistent theme echoing in the ecosystem is that government grant programs – while important and useful – are often too cumbersome, time-consuming, and delayed in decision-making to be useful to firms in this part of the market. It is important to review the objectives of government funding programs with respect to the needs of startups and the strategy and risk perspectives they have. There is also a high-level of volatility in grant program deployment, with programs changing, falling out of favour, being discontinued and the like when governments change or otherwise on quite short notice. These two elements – the complexity and the volatility – lead to a high risk of firms sinking time and effort on securing grants which may or may not come to fruition. Put another way, firms need (especially early stage, non-dilutive) grants in this space, but pursuing them can divert firms from their commercialisation objectives. Embracing speed, simplicity and predictability on the part of government grant design would do much to address these issues.

Grants... with strings: Grants from government – while important and extremely helpful to kick-starting early stage MedTech companies – need to be well-used by those firms rather than merely flattered away. In this respect, 'voucher programs' which involve grants that are tied to certain types of expenses, are useful. What is important and critical to note, though, is that these expenses should not just be technology-related: vouchers that allow firms to invest in necessary commercial skills and capabilities should be explored. Indeed, larger grant programs, such as NHMRC and ARC grant programs – especially when they involve industry

linkage elements – could also usefully be supplemented with requirements placed upon teams to train, develop or involve commercial and related skills.

Using the power of convening and information dissemination:

Government does more than simply handing out money and making legislation. And the influence of government, if rightly applied, could make a significant difference for the health of the MedTech market in Australia. For example – encouraging alternative procurement settings for public sector agencies and systems would have a significant impact on smaller, newer firms that at present struggle to access these systems. The same is the case in respect of information collection and dissemination. Information asymmetries hamper the competitiveness of newer firms, and indeed make it difficult for such firms to build the case for their products. Small changes in government practice in this regard – think of the context of health outcome measurement and publication, or agency spending patterns – should be explored.

The convening role of government should not be underestimated. Breaking out of niches and to learn from the experiences of others is critical to success yet is difficult to measure in traditional government terms. Essentially, convening allows peer-to-peer learning and interaction which is invaluable to the development and growth of startups.

Build ecosystem and value

networks: context and ecosystem matters in respect of MedTech and innovation elements of the economy. The health and vibrancy of innovative enterprises depends upon the robustness, quality and supportiveness of the connections, institutions, process and practices that mark out the context in which they grow up. Government has a role in exploring, optimising and refining that context and ecosystem – a role which it is only just now beginning to explore. What infrastructure makes a difference to these firms, and at which point of their journey? What connections will help startups to connect beyond their original niches and scale more broadly? How can government smooth the path for collaboration between large firms and new entrants? Where can mentoring relationships and pairing programs be established between players of different sizes and locations in a global value chain? How can government and public entities be helped to relate and connect differently to improve this part of the economy? These are all questions thrown up by the recognition – forced on us by analysis and common sense – that context matters if we wish to have a thriving MedTech economy in this country.

Don't underestimate the role of the garage-inventor: Policy and programs for early stage funding of enterprises are often directed in the safe-zone of publically funded research organisations (PFROs), and not towards the garage inventor.

PFRO incentives are geared towards driving publications, not financial or healthcare returns to the nation. The mindset (or skill set) of a PFRO inventor is not of commercialisation but of distributing knowledge. As should be expected, universities train academics and often not commercially-thinking researchers. The motivation to succeed in a startup is less relevant to a university-inventor compared to that of a garage-inventor, as a result more likely to fail. Targeting programs for deep-tech startups from outside PFROs – the more isolated badlands of commercialisation should be considered.

But, we caution – optimising our MedTech environment is not just for government, or just for policy makers. It is a collective task and a collective obligation.

And we must not forget: when Australia innovates, the world of healthcare changes. Be it the ultrasound or the pacemaker, penicillin or IVF.

Australian MedTech can no longer slumber, mired in stagnation or internal competitiveness. We owe our nation more than that. We owe healthcare more than that. We owe the world more than that.

Let us all – collectively – join our heads, our hands and our action to strike out towards a brighter future.

ⁱ According to the OECD, Australia has slumped to 25th position (from 17 in 2010) in the top 25 of the key global economy developed world manufacturing list

ⁱⁱ According to the Parliament of Australia performance on manufacturing report 2014

ⁱⁱⁱ According to the Medical Technology Association of Australia

^{iv} According to the Australian Government's 2016-17 Science, Research and Innovation Budget tables

^v According to the 2015 Australia OECD report

^{vi} According to the 2015 Australia OECD report