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DESIGNING FOR A FUTURE-READY SINGAPORE HEALTH WORKFORCE

Growing need for chronic care in Singapore — automation could make 15.7 million extra working hours available

Singapore's ageing population is increasing the need for chronic care that focusses on pre-existing or long-term illness. The proportion of older adults (over 65) with three or more chronic illnesses nearly doubled in the last decade, and by 2030, a quarter of Singapore's population will be over 65[1] and may be affected by chronic illness and the need for chronic care.

Combined with a shortage of domestic workforce, increased demand has led to growing healthcare costs– in excess of Singapore´s GDP growth. The national healthcare system cannot meet these challenges using traditional care models.

1 The Transitions in Health, Employment, Social Engagement, and Inter-generational Transfers in Singapore (Signs) Study, Duke-NUS Medical School's Centre for Ageing Research and Education and the Ministry of Health.

Accenture Singapore has created a case study based on primary and secondary research that helps to address the challenge by shaping a new care model. Our "Future Ready Healthcare Workforce" case study indicates that the healthcare ecosystem in Singapore has the potential transform by means of automation, and free up 15.7 million working hours. Those hours can be reallocated to tasks like caring for older, chronic patients. That's the equivalent of hiring another 7,548 full-time employees (8 percent of its total healthcare workforce) per annum, by leveraging the potential of innovative technology[2].

The suggested scenario is to enhance the capacity of Singapore´s healthcare system in a cost-optimal way, recognizing the service demand increase due to an aging, and often a chronicly ill population. The looming reality of an ageing Singaporean population with a far greater proportion of chronic illnesses has significant, and perpetual, implications for the sustainability of healthcare. Automation could go a long way to mitigating Singapore's potential workforce capacity crisis before any new workers need to be hired. Let's see how.

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[2] Accenture Future-ready Healthcare Workforce Study, Sept. 2019

Technology is transforming the future of healthcare work

Healthcare providers need to find alternative, cost-effective ways of providing healthcare services, so the future of healthcare work is being driven by technological advances that improve sustainable care. Doctor-patient relationships are evolving so that doctors are not constrained to consulting rooms.

Digitisation helps healthcare workers to direct their focus on patient care rather than administrative tasks. Healthcare workers require reskilling and training to match new working environments that are increasingly software based and supported by intelligent machines. These are just a few facts of the new healthcare reality.

Explore automation at task level

Health executives should examine the possibility of handing over some tasks to machines, thus optimising human performance and freeing up healthcare workers to do more important work in personal patient care. Tasks to be handed over include, but are not limited to, administrative tasks. Artificial Intelligence (AI) functions like machine learning, automated scanning and interpretation of documents increasingly affect and improve many aspects of the way we live and work. Healthcare is no exception. Software robots[3] can possibly outperform humans by some margin when fast, accurate execution of repetitive, rules-based work is required. We calculated the saving potential based on the annual baseline human worker effort the Singapore healthcare system performs.

SUPPORT ROLES

For support roles (like pharmacy technician, medical records clerk, lab scientist or hospital services manager), one in four roles have medium potential, involving more than fifty percent of their tasks, for automation. This would reallocate up to 5.5 million healthcare work hours per year, or the equivalent of SGD94m (US$69.23m) in additional economic value, to create additional healthcare capacity.[4]

HEALTHCARE PROFESSIONAL ROLES

For healthcare professional roles like physiotherapist, staff nurse and medical practitioner we found lower automation potential percentage wise (7 percent) but even higher economic saving potential than for support roles given bigger workforce size and higher cost per role. We calculated a total saving potential of SGD227.6m (US$167.4m), releasing 10.2m hours per year to allow for use for completing other important tasks.[5]

[3] Including expert systems, virtual assistants and other chatbots and AI systems.
[4] Accenture Healthcare Automation PoC 2019
[5] Ibid.

Additional capacity released, and monetary value of capacity, for key Singapore healthcare professionals and support roles

The following chart shows the additional time potentially released, and the monetary value of that capacity. The time released by automation could allow healthcare workers to focus on other activities. To illustrate: 37 percent of healthcare receptionists' tasks, on average, can be automated and the potential time savings can be re-allocated to do other important tasks.

SUPPORT ROLES

Job	Automation Potential (%)	Saving Potential / year ('000 SGD)
Pharmacy Technician	50	43,750
Laboratory Scientists	31	22,500
Medical Records Clerk	68	9,032
Clinical Research Coordinators	9	8,182
Hospital Administrators	27	6,136

HEALTHCARE PROFESSIONAL ROLES

Job	Automation Potential (%)	Saving Potential / year ('000 SGD)
HealthCare Receptionist	37	60,374
Medical Practitioners	6	58,667
Nurses[6]	22	44,879
Physiotherapist	25	22,500
Pharmacists	10	20,100

Table: Top 5 professional and support roles in terms of automation potential of 25 total roles analysed in the Singapore healthcare workforce.
Source: Based on market research conducted by Accenture Singapore

[6] Includes Senior and Staff Nurses (7 percent), Enrolled Nurses (3 percent), ICU Nurses and Anesthetists (12 percent)

Consider impact on skills and ways of working

Automation targets the activity level of a specific role and can unlock value that enhances sustainability. It has the potential to automate specific activities in both front line and support roles. This frees up patient care capacity and time to perform tasks workers are needed for and suited to, by performing vital-but-repetitive tasks potentially less interesting to humans. As machines augment human healthcare workers, mostly unknown fusion skills like intelligent interrogation[7] and judgement integration[8] will require new ways of working from healthcare workers and demand greater flexibility and rapid adoption of new skills.

AI has also been made more understandable by vendors working with regulators to reduce risk. IDx Technologies, the world's first autonomous AI approved by the US Food & Drug Administration (FDA) to make screening decisions without a physician, worked with the FDA for eight years to get the product approved. The solution has now been adopted at retail health clinics across the US.

[7] Intelligent Interrogation – Knowing how best to ask question of AI, across levels of abstraction, to get the insights you need.
[8] Judgment Integration – The judgment-based ability to decide a course of action when a machine is uncertain about what to do.

In particular, intelligent process automation, conversational intelligence and augmented human intelligence will help transform the way healthcare workers go about their tasks. Intelligent process automation helps to drive efficiencies and effectiveness based on a combination of software robotics and machine learning/deep learning capabilities; conversational intelligence uses virtual agents to deliver a superior patient experience, while augmented human intelligence helps to leverage AI capabilities and complement human intelligence on core human-driven processes. Let's look at how these dynamics applies to specific tasks in physician and nursing roles. The potential for automation falls into three broad areas: triage & patient assistance, preliminary diagnosis, and ongoing preventative care.

TRIAGE

In terms of triage, robots like Pepper can perform hospital reception duties and accompany visitors to their intended departments. Machines can also scan incoming cases for multiple clinical findings, determine their priority, and route them to the most appropriate doctor in the network, and even take the patient's vital signs to save in the healthcare system and then run through a series of pre analysis questions to update the medical history.

PRELIMINARY DIAGNOSIS

When it comes to preliminary diagnosis, bots can access medical histories to generate more personalised solutions including a detailed symptom assessment report, and provide the option to contact a real doctor. They can follow up with users on past symptoms and, if the need arises, set up live video consultations with medical practitioners. Bots can also interact with patients using natural language processing to understand concerns and responses, and determine if a patient is on a risk trajectory. If they are, the bot will establish why, whether if the outcome can be changed and identify interventions that will most effectively lower clinical risk.

Some examples already in the pipeline include Ada, a bot that both keeps a medical history to generate more personalised solutions and detailed symptom assessment reports, and also provides the option to contact a real doctor. Ada asks patients simple and relevant questions through conversation-like chats, helps healthcare professionals (HCPs) to find possible explanations for the symptoms presented, and suggests an optimized care setting for follow-up treatment.

With Ada, information on the patients' medical history and symptoms are at the HCP's fingertips, enabling them to make clinical decisions more effectively. Then there's "WellPoint", the brainchild of BeWell Innovations in Belgium, which uses a kiosk to check patients' vital signs before they consult with a human healthcare worker. BeWell says a human nurse would take an average of seven minutes to do this, with a few more minutes to update medical records, where WellPoint does it in three while updating health records at the same time.

The Way Forward – Five Key Steps for future healthcare provision

Future healthcare provision in Singapore should be reinvented by embracing todays technologies, recognizing that the current systems must continue to deliver excellent healthcare and can´t be put at risk. Healthcare executives need to:

1. Pick the right roles and activities

after understanding the potential for automation to make healthcare more sustainable. Our case study can serve as a baseline, having identified tasks that are optimally suited to automation.

2. Reinvent healthcare processes

and innovate the way work is done (while maintaining critical healthcare delivery), rather than applying technology to existing methods and structures. Find "green field" spaces to apply the new technologies rather than reinforcing old methods and structures.

3. Redesign roles

in a more fluid manner to provide for role mobility and enable healthcare workers to progress along a learning pathway that doesn't necessarily heed traditional role definitions, but rather focuses on skills in a modular fashion. Start with those who volunteer to change the way they work for the better

4. Explore and pilot new workforce models of care

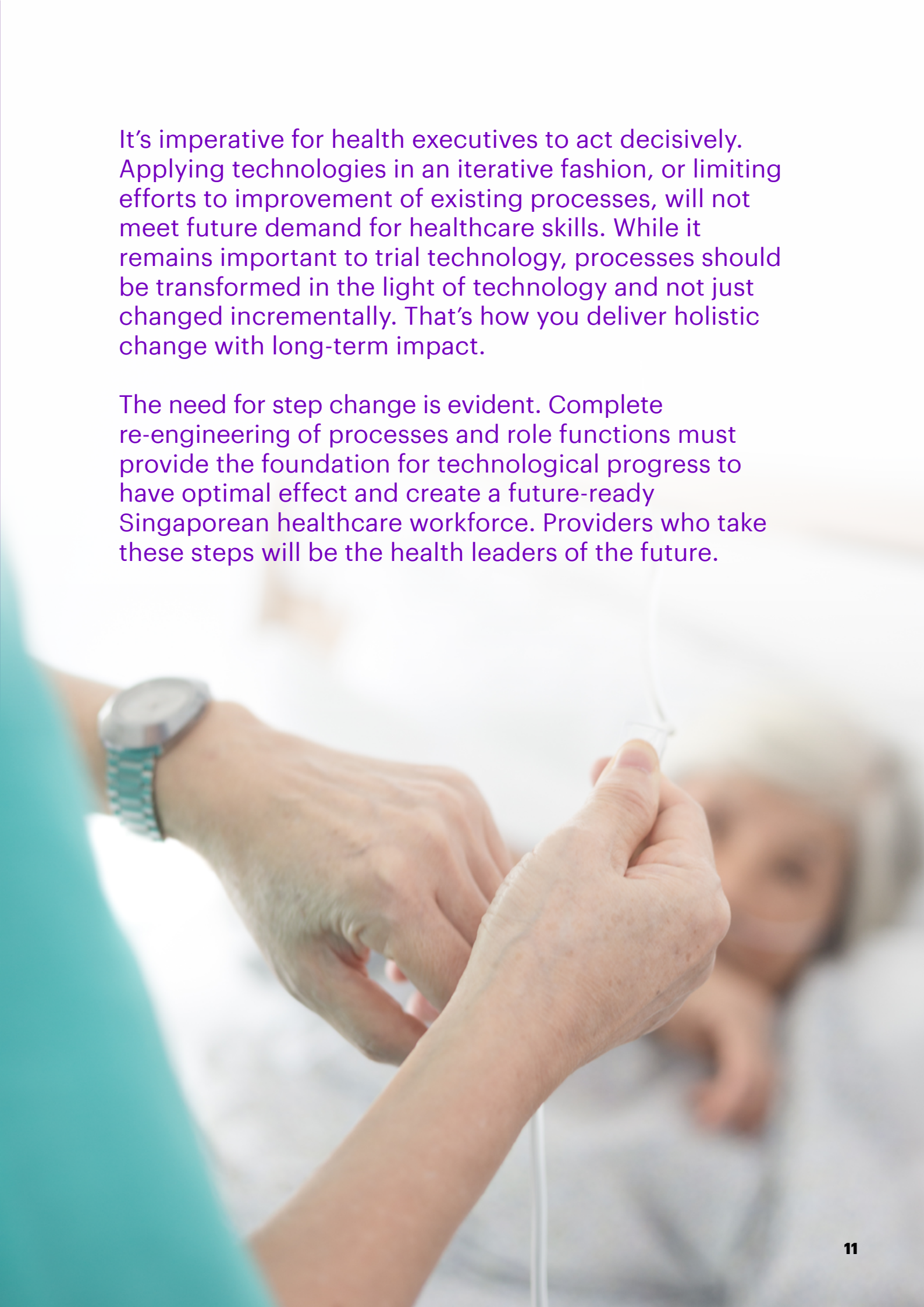
to use self-managed teams and internal talent pools, like moving from role-based organisations to skills-based organisations where specific expertise is used more optimally by means of workforce triage.

5. Overcome trust issues.

Sixty-one percent of activities in the missing middle (where human-machine hybrid teams are required) require employees to do different things, and to do things differently. In this context, building trust among key stakeholders is vital.

It's imperative for health executives to act decisively. Applying technologies in an iterative fashion, or limiting efforts to improvement of existing processes, will not meet future demand for healthcare skills. While it remains important to trial technology, processes should be transformed in the light of technology and not just changed incrementally. That's how you deliver holistic change with long-term impact.

The need for step change is evident. Complete re-engineering of processes and role functions must provide the foundation for technological progress to have optimal effect and create a future-ready Singaporean healthcare workforce. Providers who take these steps will be the health leaders of the future.



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About Accenture´s Future-Ready Healthcare Workforce

Accenture´s case study included analysing 25 roles (17 front line roles and eight support to front line roles) which represent 76,350 people in the Singaporean healthcare system (or 158,808,000 hours and SGD4.04bn/ US$2.98bn in cost). The analysis was conducted in 2018 based on publicly available data from Government websites and extensive interviews and consultation with Accenture experts. Findings and recommendations were shared with Ministry and Hospital executives in various sessions and refined based on feedback.

About Accenture Insight Driven Health

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