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Leadership and Context to Create the New Technological Society

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Abstract: Technological advances have been instrumental in creating a new form of society, where developments have led to the creation of new products and mechanisms, precipitating a revolution of all aspects of personal and professional life. Every sector has seen changes in service and product delivery with improvements and paradigm change being prevalent. The advent of disruptive technologies have caused major shifts in social, political and economic life. The recent global pandemic exemplifies the revolution in communications, where socialisation, commerce and professional activities, including teaching and government, could continue despite severe restrictions on the movements of most of the global population [1]. The 'new normal' was virtual, via standard, widely available technologies.

This entails the use of systems thinking to develop new knowledge via artificial intelligence, analysis of big data to enhance understanding, formation of virtual teams to deliver societal outcomes, agile techniques to organise innovation and transformational leadership to stimulate the requisite changes. Research to identify and create these changes has been critical in global developments to date.

This paper uses a review of a broad range of literature to consider the key requirements for leadership and environmental context to develop and sustain the new technological society. The objective is to try to provide a summary of some of the critical elements needed to further the 'new world order'. This will provide a basis for further debate and questions concerning leadership and the use of resources in the next iteration of the technological society.

Keywords: Information Technology, Artificial Intelligence, Systems Thinking, Transformational Leadership, Virtual Teams, Agile Project Management

1 INTRODUCTION

The key questions to be considered, in the new technology-based society are –

How can we create a better world using Artificial Intelligence and other modern developments, in the Fourth Industrial Revolution?

What kind of environment is needed for society to create these changes?

What is needed in terms of leadership to take advantage of these developments?

This paper attempts to address these areas, considering the some of the principal factors that shape the societal environment. This could assist in determining the optimum environment for beneficial technological change.

This new society uses technology to provide a huge range of products and services, from cryptocurrency, 3D printing, communications, automation, smart cities, planning and production, contributing to every sector - public, private and charitable. Education, health, food production and leisure are key areas that have benefitted from the drive to innovate in technological terms. Tensions exist between the new and old worlds with 'clean' power and fossil fuels still competing. The production of waste, especially plastic, greenhouse gases, destruction of the environment and utilisation of resources remain contentious issues to be addressed by this an future generations. The airline and technology industries, with their demand for power, production of waste and greenhouse gases are cited as major contributors to the destruction of the environment. The need is for new technologies to address these problems and improve the environmental position. The pursuit of profit at the expense of the world's resources is no longer viewed as a sustainable model. Social disparities also need to be addressed with technology providing the means to enhance education, employment and communications for all citizens. The potential is for the new technological forms and organisations to make a positive contribution to this sphere, driven by the right leadership. This paper identifies some of the key elements to help to create this new society.

2 ARTIFICIAL INTELLIGENCE

The use of technology has extended to all of areas of modern life, as the ability has increased from simple automation and application of processing power. The original applications of technology enabled a greater volume of work to be completed in a shorter time and to a higher standard than manual effort. Factory processing is an example of

this type of application. Advances in technology haation and transactions to occur. This includes adequate cyber security measures to combat potentve improved the range and type of tasks that systems can provide. The levels are stated –

Expert Systems are knowledge repositories and can process as instructed, based on the specific storage; Machine Learning is the ability of IT to make assumptions based on the stored information, such as suggesting further options (for example consumer options in terms of products, based on existing buying patterns); Natural Language Processing represents a further advancement, in that the system can receive instructions in normal spoken or written language and does not require specialist programming to be employed; Neural Networks are a further evolution of technology as these replicate the processes of the human brain, permitting the recognition of patterns in data and possessing the ability to 'learn' and improve its functions over time.

Information Technology can employ all of these different 'modes', as required by the specified tasks.

3 KNOWLEDGE MODEL

Organisations need to be designed to accumulate, filter, disseminate and utilise knowledge. This process should be mapped, enabling clear analysis to be effected. The human and technology aspects should be identified, with data sources, requirements and repositories being itemised. A knowledge 'system' is needed to ensure the capture of this valuable commodity. This should be envisaged as a value chain, subject to design considerations as per any commodity. The use of storyboard techniques to gather data and convert it to useful knowledge is recommended [2]. It is important to recognise that knowledge is embodied in the people and culture of an organisation, as well as the systems and procedures. The capture and utilisation of knowledge from external sources, for example via environment scanning, can be a critical activity. The existence and development of an organisation may depend on these, as such tasks can register the appearance of disruptive technologies, for example. The intranet and website can be part of this knowledge system, as well as the planning, programming and collaboration software.

The use of Big Data systems to capture and codify information is necessary for many organisations [3]. The utilisation of structured and unstructured data may be required to permit effective decision making. The prevalence of the latter forms, as images and text, for example present in social media, has changed the mechanisms for the knowledge economy. Systems are hence needed to accumulate and filter such unstructured, high volume, velocity and varied data then extract the value for the organisations. Procedures need to be developed to gather data from the external environment, process it and capture the essence in the internal knowledge systems, so that it can be utilised effectively. The need for the development of predictions and assumptions from this data is prevalent, aligning with the higher order use of AI. Project processes thus employ systems to create outcomes so information becomes a company asset.

The aim is to achieve 'triple-loop' learning [4]. Technology projects create learning, which is evaluated, in terms of lessons learned. Action is reflected on then decisions made to further act then capture the knowledge in a 'cycle' of learning. This can represent different 'loops' of learning. The project loop concerns decisions and actions to meet the required targets. This may require changes in the process loop, so that the resourcing and configuration of the project are influenced. The highest level here is the organisation loop, where the culture is adjusted to sustain the project. This can be a dual influence, as culture can change the project, for example in a network organisation. The latter enables good communications with knowledge readily disseminated, overcoming the temporary nature of projects. The ability of an organisation to learn at several levels, via people, systems and documents is paramount.

A suitable ecosystem is required to promote and sustain technology business [5]. Trust is needed in terms of security, trading conditions and financial institutions in order to allow collaborial fraud, disruption and destruction of assets. The ability to communicate securely and conduct signed transactions, both personal and corporate, is essential for organisations to operate. The ecosystem should thus sustain these activities, in a built and regulated environment. The potential for fraudulent or malicious hacking, such as ransomware, needs to be reduced.

Protection for the consumer or user should be in place, both technically and as legal rights. The privacy of individuals and companies should be protected, with legislation. The balance between freedom of information for the public good and data protection for individuals needs to be maintained.

The resources for company activities should be

available, in terms of power, raw materials, finance and skilled staff. The raising of finance for innovation should be enabled, via social media, grants or loans. The length of time before payback and even sustaining losses should be factored into the investment decisions.

4 GLOBAL VIRTUAL TEAMS

Global virtual teams are needed to enhance collaboration in the new technology society. Teams connected by communications technology can maximise the capacity to innovate. Global resources can be utilised to create and operate innovations in IT and leverage technology to produce new products and services. Teams are no longer limited to local resources, including expertise, to address commercial and public sector projects. The key is to utilise effective communications systems to create and run such teams. Roles and objectives are defined and are asserted then aligned across the team [6]. The members, having been selected and then socialised to develop trust, can then operate effectively to deliver objectives, producing individual and team performance. Roles are thus allocated, defined and negotiated, in order to deliver the required outcomes. The team therefore enact a cycle of formation to overcome barriers, such as time, language and culture, to establish norms and achieve delivery. Effective communications systems, including knowledge repositories, are vital to this process.

This virtualisation of the team structure can be further extended to the IT resources, with migration to a cloud infrastructure [7]. Elements of the IT provision can be delegated to a specialist provider, while the organisation retains the core aspects and focuses on their provision. This should provide economies of scale, access to expertise and the ability to vary IT demand as required without having to purchase hardware to cover the potential maximum operating conditions. The options are to have the infrastructure, platform or application provided, so that the hardware and some of the software are supplied by the cloud provider. The critical elements in the migration decision are cost, trust in the provider, security concerns, and the 'pull' and 'push' influences. The 'pull' factors are the positive perceptions, such as the perceived usefulness and expected availability of the service. The 'push' factors are the level of dissatisfaction with the prevailing IT arrangements, possibly projected into the view of meeting future needs. The experience of the decision-makers and other key references are also critical. A generic model of cloud migration includes assimilating the legacy system knowledge then making a choice of provider and the option, in respect of the elements to outsource [8]. A solution can then be designed with a test scenario produced, to try to determine and resolve any incompatibilities. The migration can then be planned and a test enacted, followed by deployment to the solution. The organisation can then leverage its expertise in respect of the core business, supported by the cloud provision.

5 AGILE METHODS

The most suitable techniques for new project development are those of Agile Project Management methodology [9]. The use of the prototype model to develop products rapidly via customer or user interaction is essential in a design mode and complex, volatile environment. Products can be created and implemented rapidly, with received changes to the specification being flexibly incorporated in the prototyping cycles and method of team organisation. Planning needs to be flexible, using such techniques and sprint (cycles of work to produce a prototype) plans need to be adjusted frequently to ensure that the current position is encapsulated.

6 LEADERSHIP

The recommended form of leadership for the new industrial age is transformational [10]. This is an evolutionary approach, providing incremental change from within the organisation or government. The aim is for leaders to inspire and stimulate others with their new vision of the future. This needs to be achieved by charismatic, powerful individuals who can resource this change, developing commitment to the new technology or organisational project. This operates best in a time of environmental uncertainty and with project characteristics that have a high degree of task novelty. The leadership's vision offers a new certainty in a time of ambivalent conditions and requires extreme measures to bring radical change to the organisation. This could be vital in terms of the survival of the company, providing the rational for the change, which the leadership tries to get the key stakeholders to 'sign up' to, via persuasion, education and communication.

7 NEW FORMS OF BUSINESS

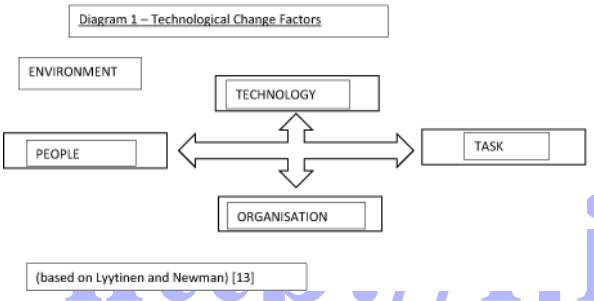
The organisations that will thrive in the 'new economy' are viewed as being those that create value through collaboration [11]. Complementary products, for example (common in technology) and adaptive organisations, engaging in partnerships and possibly multiple collaborations are viewed as

being in an optimum position to exploit the new prevailing opportunities. This leads to new types of projects, created by synergistic connections of the human and technical resources of companies in a global, virtual environment.

The new organisations should also have social as well as economic objectives [12]. The threats to the environment have resulted in global agreement and regulation (such as the UK Government banning the production of new petrol and diesel cars from 2035). Social disparities also need to be addressed and many companies are now active in helping to address some of these with charitable acts. The new companies need leadership to introduce transformative change, with an accompanying organisational structure that supports the twin requirements of financial and environmental objectives. A balance between these two aims is needed to ensure that economic viability is achieved and a positive impact is made on the environment. This definitely requires the recruitment and socialisation of employees to 'buy in' to this type of organisation.

8 SUMMARY

The key elements in the organisations can be summarised as per diagram 1. The change factors are present and if one factor is amended then the others will shift until an equilibrium is reached (based on Lyytinen and Newman [13]). Change will occur as a minor shift in respect of leveraging existing technology and a major dislocation, when a disruptive technology is introduced into the environment. The new organisation form will be able to accommodate and generate such change, utilising knowledge strategies based on big data processing, agile methods, cloud based and virtual teams with both economic and environmental objectives. Transformation leadership will be required to facilitate such change by creating the organisations and projects to embrace the new technological age.



REFERENCES

[1] Clark, T.R. (2020), "8 Ways to Manage Your Team While Social Distancing", Harvard Business Review, *Leading Teams* 24 March: 1–6

[2] Duffield, S. and Whitty, S.J. (2016), "How to apply the Systemic Lessons Learned Knowledge model to wire an organisation for the capability of storytelling", International Journal of Project Management, 34: 429–443

[3] Whyte, J. et al. (2016), "Managing change in the delivery of complex projects: Configuration management, asset information and 'big data'", International Journal of Project Management, 34: 339-351

[4] McClory, S. et al. (2017), "Conceptualising the lessons-learned process in project management: Towards a triple-loop learning framework", International Journal of Project Management, 35: 1322–1335

[5] Tsatsou, P., Elaluf-Calderwood, S. and Liebenau, J. (2010), "Towards a taxonomy for regulatory issues in a digital business ecosystem in the EU", Journal of Information Technology ,25: 288–307

[6] Henderson, L.S., Stackman, R.W. and Lindekilde, R. (2016), "The centrality of communications norm alignment, role clarity and trust in global project teams", International Journal of Project Management, 34: 1717-1730

[7] Bhattacherjee, A. and Park, S. (2013), "Why end-users move to the cloud:
a migration-theoretic analysis", European Journal of Information Systems: 1-16

[8] Fahmideh, M., Daneshgar, F., Rabhi, F. and Beydoun, G. (2019), "A generic cloud migration process model", European Journal of Information Systems 28:3, 233-255

[9] Surendra, N.C. and Nazir, S. (2019), "Creating "informating" systems using Agile development practices: an action research study", European Journal of Information Systems, 28(5): 549-565

[10] Tyssen, A. et al. (2014), "The challenge of transactional and transformational
leadership in projects", International Journal of Project Management, 32: 365–375

[11] Jacobides, M.G. (2019), "In the ecosystem economy, what's your strategy?", Harvard Business Review, 97 (5) September/October: 128–137

[12] Battilana, J., Pache, A., Sengul, M. and Kimsey, M. (2019), "The Dual-Purpose Playbook", Harvard Business Review, 97 (2) March-April: 124–133

[13] Lyytinen, K. and Newman, M. (2008), "Explaining Information systems change: a punctuated socio-technical change model", European Journal of Information Systems, 17 (6): 589-613

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