

## An Overview of the Five Stages of the ITEC Roadmap



This is a condensed excerpt from “Ethics in the Age of Disruptive Technologies: An Operational Roadmap,” produced by the Institute for Technology, Ethics, and Culture (ITEC). ITEC is an initiative of the Markkula Center for Applied Ethics at Santa Clara University, with support from and collaboration with the Vatican’s Centre for Digital Culture at the Dicastery for Culture and Education. The Institute convenes leaders from business, civil society, academia, government, and all faith and belief traditions, to promote deeper thought on technology’s impact on humanity. We also have additional resources, including an [overview of the book](#)<sup>1</sup> and a summary of the [principles](#)<sup>2</sup> used in the book.

Part 1 of *Ethics in the Age of Disruptive Technologies: An Operational Roadmap*, known as the *ITEC Handbook*, describes each of five stages of a roadmap for defining and implementing a Responsible Technology Governance Framework and Responsible Technology Management System. ITEC is the acronym for the Institute for Technology, Ethics, and Culture, which convenes leaders from business, civil society, academia and government to promote deeper thought on technology’s impact on humanity. Later in the handbook’s second part, each stage is described in greater detail. What follows here is a high-level overview of the stages and the four appendices.

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<sup>1</sup> ITEC, “Bridging the Gap between the Theory of Ethical Principles and the Practice of Technology Ethics in Organizations: The ITEC Primer,” *Markkula Center website*, June 2023, available at: <https://www.scu.edu/institute-for-technology-ethics-and-culture/itec-primer/>

<sup>2</sup> ITEC, “ITEC Principles and How to Use Them: Anchoring, Guiding, Specifying, and Action,” *Markkula Center website*, June 2023, available at: <https://www.scu.edu/institute-for-technology-ethics-and-culture/itec-principles/>

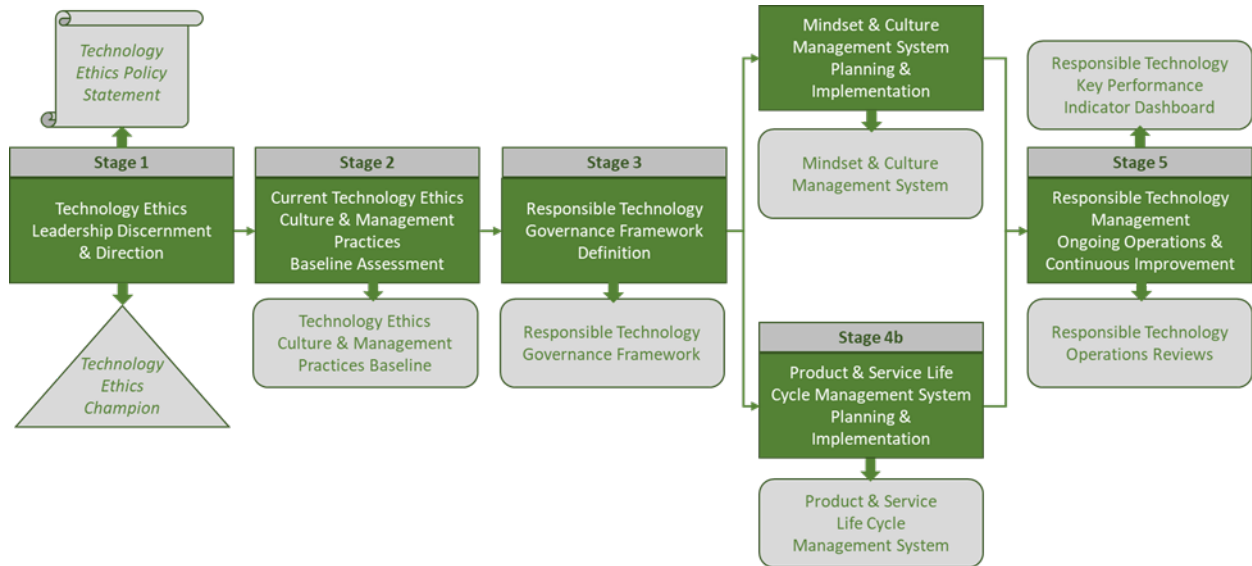


Figure 1: ITEC Operationalization Roadmap

## Stage 1: Technology-Ethics Leadership Discernment & Direction

### Deciding to Commit

Before anything else, an organization must decide that this transformation towards ethical technology is important and that they are not only willing to make this transformation, but willing to put in the effort and resources required to fully operationalize this transformation. As with any difficult journey, before embarking, one needs to firmly decide to do it.

In some organizations half-hearted efforts towards ethical transformation lead to confusion and frustration. In the worst cases, half-hearted efforts can lead customers and employees to become upset, some may leave (willingly or unwillingly), scandalous stories emerge, and multiple relationships of trust are damaged or destroyed. Despite the danger of half-hearted efforts, making no effort at all towards ethics is undoubtedly worse. In all cases, reputations are at risk, not only of individuals, but of organizations and entire industries – as shown by the social media industry’s fall from grace over the mid-to-late 2010’s.<sup>3</sup>

<sup>3</sup> Michelle Quinn, “Social Media’s Year of Falling from Grace,” *VOA (Voice of America)*, December 28, 2018, available at: <https://www.voanews.com/a/social-medias-year-of-falling-from-grace/4720477.html>

Technology-ethics leadership (Board of Directors & C-suite) buy-in, commitment, and direction is the desired outcome of this critical first stage, which is owned by the CEO or the Technology Ethics Champion with the full support of the CEO. To effectively discern what, if anything, should be done to address technology ethics at the enterprise level, the Board of Directors, and key executives, should first be briefed on customer & stakeholder needs, socio-technical responsibility, and state-of-the-art technology ethics practices.

Discussions must take place to understand the impact of advanced technologies on the enterprise’s social responsibility, as well as the external and internal risks of doing nothing or not enough. These initial steps should be followed by an initial assessment of the current technology management mindset, culture, and management practices.

Review of the initial assessment report will lead to the desire and decision by the enterprise leadership to focus, or not, on technology ethics. The scope of the effort, and the resources needed should be defined and agreed upon. This decision should be translated in a formal “Technology Ethics Strategic Initiative” (see Part 2, Stage 1) lead by the Technology Ethics Champion.

Before this strategic initiative can be announced to all employees, an anchoring principle, and an Enterprise Technology Ethics Policy Statement must be produced (see Appendix 3 for a sample of what this document might look like). These two foundational documents and the appointment of an executive-level technology ethics champion will signal all employees the intent and commitment of the leadership. They are the key deliverables of this stage.

Stage Owner	<i>Technology Ethics Champion</i>				
Desired Outcome	<i>Technology Ethics Leadership (BOD &amp; C-Suite) Buy-in, Commitment, and Direction</i>				
Stakeholders & The Common Good	Social Responsibility	Technology Ethics Best Practices	Culture & Practices Assessment	Technology Ethics Strategic Initiative Key Success Factors	Technology Ethics Strategic Initiative

Figure 2: Stage 1 Areas of Focus

## Stage 2: Current Technology Ethics Baseline Assessment

### Assessing Where You Are

After deciding but before starting any journey, you must assess your own starting location. Merely beginning a journey – even if moving towards a good destination – can end in disaster if you are not in the starting location that you believed you were in.



The desired outcome of Stage 2, owned by the Technology Ethics Champion, is to obtain an actionable inventory and baseline assessment of current technology-ethics mindset, culture and, management practices throughout the entire product/service life cycle.

In this stage, the Technology Ethics Champion leads the dialogue to define how the baseline assessment should be conducted. Then, the internal and external perceptions of corporate accountability and the technology ethics infrastructure should be discussed to understand the current leadership commitment and accountability.

The assessment should also include how ethical principles align with the organization’s foundational documents and how aware of them employees are. The organization ethical decision-making framework and the ethical alignment of the product and service life cycle processes should also be addressed. Review of the current workforce diversity, recruitment policies and practices, and employee performance management will provide the employee development and empowerment baseline.

To assess technology ethics performance management the different categories of current key technology performance measures along the pathway to impact and the control processes in place should be reviewed.

The baseline assessment instrument should be carefully defined, potentially including a survey questionnaire and one-on-one interviews. Employees must feel comfortable sharing their input with management. Sometimes third-party organizations that can anonymize answers can be helpful for getting honest answers from interviewees who might be concerned about how their responses might be received (the Markkula Center for Applied Ethics has done and can do this for organizations).

Stage Owner	<i>Technology Ethics Champion</i>				
Desired Outcome	<i>Current Technology-Ethics Culture and Management Environment Baseline</i>				
Leadership Commitment & Accountability	Guiding Principles & Mission Alignment	Ethical Decision-Making Framework	Product & Service Life Cycle Ethically Aligned Processes	Employee Development & Empowerment	Technology Ethics Performance Management

*Figure 3: Stage 2 Areas of Focus*



# Stage 3:

## Responsible Technology Governance Framework Definition

### Defining a Responsible Technology Governance Framework

The objective of this stage, owned by the Technology Ethics Champion, is to define a governance framework connecting enterprise and stakeholders for social, technical, and business alignment. The responsible technology governance framework is a component of enterprise governance.

This particular governance framework is the destination for the journey, the master plan for the organization to transform its culture and develop an enterprise responsible-technology management system which focuses on meeting customer requirements, and stakeholder ethical values throughout the entire life cycle of its products and services.

This is what the organization needs to implement in order to institutionalize responsible technology innovation for the common good.

The anchoring principle must be translated into the elements of an ethical mindset and inclusive culture, which includes direct and indirect stakeholders in the engineering effort. It is also the foundation for the development of the policies, leadership practices, processes, and tools the organization must develop and implement in order to support an open, transparent, and inclusive culture, which holds paramount stakeholder ethical values throughout the entire life cycle of its products and services.

The Technology Ethics Champion, working with the department heads involved in the various phases of the product and service life cycle, is accountable for the subsequent detailed definition, implementation plans, and implementation of the Responsible Technology Mindset and Culture, and Responsible Technology Management Systems.

The Technology Governance Framework must address:

- Leadership Commitment & Accountability
- Ethical Decision-Making & Guiding Principles
- Culture, Employee Development & Empowerment
- Ethically Aligned Life Cycle Processes
- User Ethical Use Education & Compliance
- Responsible Technology Performance Management



Stage Owner	Technology Ethics Champion				
Desired Outcome	Responsible Technology Governance Framework				
Leadership Commitment & Accountability	Ethical Decision-Making & Principles	Culture, Employee Development & Empowerment	Product & Ethically Aligned Life Cycle Processes	User Ethical Use Education & Compliance	R-T Performance Management

Figure 4: Stage 3 Areas of Focus

## Technology Governance Framework

This key document identifies the set of rules, practices, and processes defining the elements of the technology ethics mindset and culture, and the ethically aligned engineering management system the entire enterprise must develop.

The ITEC **Responsible Technology Governance Framework** illustrates the key building blocks of a responsible-technology governance framework.

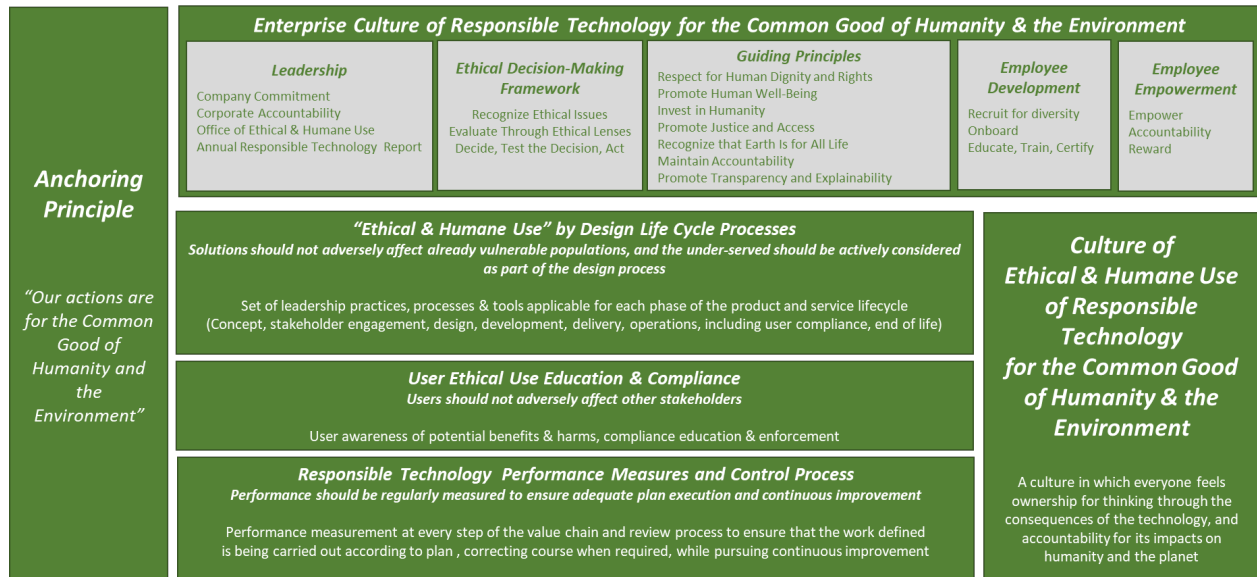


Figure 5: ITEC Responsible Technology Governance Framework

The foundation of the Responsible Technology Governance Framework is its anchoring principle: "Our actions are for the common good of humanity and the environment."

Then, the framework identifies the building blocks of the enterprise responsible technology mindset and culture the organization must develop:

- Leadership
- Ethical Decision-Making Framework

Guiding Principles  
Employee Development  
Employee Empowerment

Next, the framework describes the pillars the organization must focus on in order to operationalize ethical and humane use principles to ensure products and services, throughout their life cycle, focus on stakeholder ethical values:

“Ethical & Humane Use” by Design Life Cycle Processes  
*Solutions should not adversely affect already vulnerable populations, and the underserved should be actively considered as part of the design process*

User Ethical Use Education & Compliance  
*Users should not adversely affect other stakeholders*

Responsible Technology Performance Measures and Control Process.  
*Performance should be regularly measured to ensure adequate plan execution and continuous improvement*

Implementation of the leadership defined technology governance framework will lead to a culture in which everyone feels ownership for thinking through the consequences of the technology, and accountability for its impacts on humanity and the planet.

## **Stage 4a: Mindset and Culture Management System Planning & Implementation**

*Stage 4 concerns actually traveling the path from origin to destination and how to do it. It is split into two parts: “4a” and “4b.” 4a concerns planning and implementing transformation of the organization’s mindset and culture, while 4b concerns transformation relating to the life cycle of products and services.*

### **Planning for a New Mindset and Culture**

Organizations have cultures, and those cultures can run the full range from wonderful to terrible. Most organizations, of course, are somewhere in the middle.





When making a transition towards more organizational emphasis on ethics, one should not assume that an organization is saying that it has done something wrong or is ethically unsound. On the contrary, choosing to try to become more ethical is itself a good ethical decision and indicative of at least some health in a corporate culture, while truly terrible organizations will run from ethics as though it were a threat.

Stage 4a is owned by the Head of Human Resources.

Using the Responsible Technology Governance Framework as a starting point, the Technology Mindset & Culture System is planned and implemented. How the project is going to be managed is an important element of the discussion. Then the plan is executed.

The system definition and the implementation plan should address:

- Leadership Commitment & Accountability
- Organizational Readiness Planning
- Responsible Technology Employee Education & Training (including ethical leadership and deliberation practices, healthy culture practices, principles and ethical decision making)
- Employee Development
- Employee Empowerment
- Implementation Project Management

Stage Owner	<i>Head of Human Resources</i>				
Desired Outcome	<i>Mindset &amp; Culture &amp; Responsible Technology Management System</i>				
Leadership Commitment & Accountability	Organizational Readiness Planning	R-T Employee Education & Training	Employee Development	Employee Empowerment	Implementation Project Management

Figure 6: Stage 4a Areas of Focus

## Stage 4b: Product/Service Life Cycle Management System Planning & Implementation

### Planning for a New Product/Service Life Cycle

The Head of Product & Service Development owns this stage 4b.





Using the Responsible Technology Governance Framework as a starting point, the Responsible Technology Management System is defined, and its implementation is planned. Then the plan is executed

The Responsible Technology Management System Definition & Implementation Plan should address:

- Stakeholder Ethical Value Requirements
- Ethically Aligned Life Cycle Processes & Action Principles
- Employee Technical Training & Certification
- Ethical Value Design & Operations Reviews
- User Ethical Use Education & Compliance
- Implementation Project Management.

Stage Owner	Head of Products & Services Development				
Desired Outcome	Responsible Technology Product & Service Life Cycle Management System				
Stakeholder Ethical Value Requirements	Ethically Aligned LC Processes & Action Principles	Employee Technical Training & Certification	Ethical Value Design & Operations Reviews	User Ethical Use Education & Compliance	Implementation Project Management

Figure 7: Stage 4b Areas of Focus

## Stage 5: Responsible Technology Management Ongoing Operations & Continuous Improvement

### Ongoing Operations and Continuous Improvement

Following the metaphor of a journey, Stage 5 seeks to monitor progress and maintain control and momentum. In the ongoing operations and continuous improvement stage, the full Responsible Technology Management System has been implemented. The desired mindset and culture are in place, and robust ethically aligned life cycle processes are delivering ethical & humane use compliant products and services that benefit the common good of humanity and the environment. This very important milestone should be celebrated by the organization and deserving teams/employees must be recognized and rewarded.

This stage is owned by the Technology Ethics Champion. The focus is on performance management to ensure continuation and growth. Planning and formal regular control is essential to build upon the foundations established during the enterprise responsible technology transformation.



During ongoing operations, the following areas should be kept in mind:

- Enterprise Planning Process
- Responsible Technology Operations & ESG Reviews
- Performance Improvement
- Responsible Technology Mindset & Culture Management System Annual Assessment
- Responsible Technology Product/Service Life Cycle Management System Annual Assessment
- ESG Reporting & Public Relations

Stage Owner	<i>Technology Ethics Champion</i>				
Desired Outcome	<i>Responsible Technology Certified Products &amp; Services + Continuous Improvement</i>				
R-T Enterprise Planning Process	R-T Operations & ESG Reviews	R-T Performance Improvement	R-T Mindset & Culture Management System Annual Assessment	Product & Service Life Cycle Mgt System Annual Assessment	ESG Reporting & Public Relations

Figure 8: Stage 5 Areas of Focus

## Overview of the Structure of Part Two

The stage overviews above are included within Part 1 of the *ITEC Handbook*. The handbook's second part explores the stages of the roadmap in more detail. For each roadmap stage, the following elements are discussed:

- A. **Desired outcome**
- B. **Stage ownership and key participants**
- C. **Key deliverables**
- D. **Areas of focus**
- E. **Stage Exit Checklist**
- F. **Resources**

### A. Desired Outcome

To focus the discussion, everyone involved must understand what is to be achieved by the end of the roadmap stage.

### B. Stage ownership and key participants

To identify each roadmap stage owner, keep in mind that the person with the most *ownership* is usually the one who has control over the people and systems resources, a good understanding of



the overall process, the ability to affect change, the power to act, and is accountable to his/her supervisor for delivering the desired outcomes. Each owner must be able to relate to the needs of the various domain experts involved in the discussion, and to listen to those who are bringing specialized expertise to the table and be sensitive to their jargon and conceptualizing skills.

The stage owner must ensure that the organization's key stakeholders are part of the conversation. It is important to note that a desired single output or set of outputs is often the result of several departments working together in an informal matrix organization structure of multiple functional stakeholders with different roles and responsibilities.

Difficulty should be expected when it comes to communication between key participants. At a conference on AI hosted at the Vatican, Boston College professor James Keenan noted that “*the discourse on artificial intelligence is occurring within very different language games. Lawyers speak legalese; theologians, theology; technicians have tech talk; and social scientists their own ways of reporting. Each field has not only its own way of conceptualizing but also different ways of assessing and judging.*”<sup>4</sup> This means that different groups of people first have to learn how to translate between languages enough so that they can even talk to one another. Lack of ability to communicate also breeds misunderstanding and distrust, and so parties should be aware of this and try to be sympathetic and understanding towards each other. Even so, misunderstandings are likely to make their appearance during transformation. Stage ownership and key participants will need to make these translation and communications efforts not only with each other, but with many other stakeholders as well. These efforts can be taxing, so be sure that adequate energy is devoted to this task.

### **C. Key Deliverables**

This section describes the key deliverables that must be produced before exiting the current stage.

### **D. Areas of Focus**

This portion of the roadmap template provides a high-level list of the topics that should be considered and discussed. These could include concepts that some participants are unfamiliar with; if that is the case, take the time to educate each team member to ensure a more fruitful discussion.

Each stage has a chart which identifies the key elements associated with the area of focus. These charts cover a lot of territory but should not be thought of as exhaustive – every organization is different and every context is different, so organizations should examine these charts and recognize

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<sup>4</sup> James F. Keenan, “7 lessons learned from the Vatican's artificial intelligence symposium,” *National Catholic Reporter*, Nov 2, 2021: <https://www.ncronline.org/news/opinion/7-lessons-learned-vaticans-artificial-intelligencesymposium>

where they might be fruitfully customized to their situation. These discussions will highlight missing elements that should be added to the chart. Updating those charts will ensure everyone is able to visualize the critical elements that must be considered to develop the required key deliverables.

The stage 1 Area of Focus is shared here as an example.

Stage Owner	CEO/Technology Ethics Champion				
Desired Outcome	Technology Ethics Leadership (BOD & C-Suite) Buy-in, Commitment, and Direction				
Stakeholders & The Common Good	Social Responsibility	Technology Ethics Best Practices	Culture & Practices Assessment	Technology Ethics Strategic Initiative Key Success Factors	Technology Ethics Strategic Initiative
Customer & Stakeholder Concepts	Social Responsibility Scope	Academia	Culture Assessment (Policies, Practices, KPIs)	Anchoring Principle	Strategic Initiative (Scope, Resources, Timeline & Budget Estimate)
Stakeholder Wellbeing Domains	Regulations	Consulting Firms	Product & Service Life Cycle Assessment (Policies, Practices, KPIs)	Technology Ethics Champion (Role & Responsibilities)	Strategic Initiative BoD Review & Approval
Stakeholder Ethical Value Requirements	Enterprise External Risk Assessment (doing nothing or not enough)	Global Initiatives	Assessment Report	Enterprise Technology Ethics Policy Statement	Strategic Initiative Kick-off
The Common Good of Humanity & The Environment	Enterprise Internal Risk Assessment (doing nothing or not enough)	Standards Organizations		Project Management	
	ESG Reporting	Competitive Landscape		Communication Plan	
		Future Trends			

Figure 9: Stage Area of Focus Form Example

## E. Stage Exit Checklist

The stage exit criteria and deliverables that should be completed before the organization can move to the next stage are identified and summarized in this section. A checklist form is provided to track the activities completed as well as those in process.

## F. Resources

A library of relevant reading material is provided for those looking for additional information.

Every Stage in Part 2 includes the above lettered parts as well as an introductory story, a formal introduction to the chapter, and references to further details, some being shown in the appendices.

# Appendices

The following topics are explored in more details in the accompanying appendices.

## **Appendix 1: Examples of Technology Ethics and Responsible Technology Principles**

There are many examples of principles in use at technology companies, as well as sources for principles from academia and elsewhere. A few sets of corporate ethics principles, as well as some ways that they are implemented at those organizations are presented in this appendix:

Microsoft’s Responsible AI Principles

IBM’s Principles and Pillars

Salesforce’s Core Values and Ethical Use Guiding Principles

Google’s AI Principles

## **Appendix 2: Principles for Responsible Technology for the Common Good**

The principles described in detail here are principles that reflect the concerns of many stakeholders around the world and across time. There are many different principles, frameworks, codes, and other documents, but in our judgment, this is the most comprehensive, detailed, and relevant list for the contemporary context. However, we also understand that organizations may wish to customize this list for their own context. This appendix can be found on the Markkula Center website: [ITEC Principles and How to Use Them: Anchoring, Guiding, Specifying, and Action](#).<sup>5</sup>

## **Appendix 3: Technology Ethics Policy Statement Example**

This short appendix provides a generic example of policy statement that can be used to develop your own enterprise-specific public commitment to responsible technology.

## **Appendix 4: Responsible Technology Performance Measures and Control Process**

This appendix focuses on the responsible technology performance measurements needed at every step of the enterprise value chain and the recommended review process to ensure that the work defined is being carried out according to plan and course corrections are applied when required.

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<sup>5</sup> ITEC, “ITEC Principles and How to Use Them: Anchoring, Guiding, Specifying, and Action,” *Markkula Center website*, June 2023, available at: <https://www.scu.edu/institute-for-technology-ethics-and-culture/itec-principles/>

