

# A STEEPLED Analysis of the SPI Manifesto

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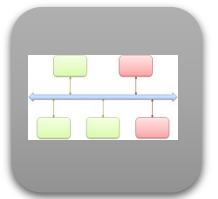
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# Context

Software Process Improvement (SPI) has been founded on the belief that a well-defined and executed process is likely to produce a high-quality product.

# Manifestos and their purpose

- A manifesto is “a public declaration of policy and aims, especially as issued before an election by a political party, candidate, government, etc.” [The Oxford English Dictionary].
- Manifestos are programmatic promises of why the current situation needs to change and/or what changes are necessary for improvement.
- Change can be realised in the form of **gradual evolution** or can be **radical and revolutionary**.
- However, manifestos rarely provide concrete guidance as to how these changes or reforms can be brought about and even less guidance is available as to how any real changes and improvements can be measured in the short or in the long run.

# Manifestos in Software Engineering

Two manifestos were issued by groups of Software Engineers (academics and practitioners in both cases), namely

the Agile Manifesto [Agile Manifesto, 2001]

and

the Software Process Improvement (SPI) Manifesto [2009]

Both of these manifestos aim to improve the software produced, through improving the process, the attitudes of software engineers, and also the organisational culture and practices.

# Agile v SPI Manifestos ?

- Compared and Contrasted [Georgiadou et al., 2019]
- Criticised and praised [Berki, E. 2004; **Siaks** K. V., Georgiadou E. and Berki E. **(2005)**].
- There have also been efforts to combine these two paradigms' principles and values in research and development projects focusing for instance on different aspects such as formality and agility [Nummenmaa et al., 2011; Mishra et al., 2019]
- Both manifestos are evolutionary rather than radical/revolutionary

# Our motivation

*To contribute and further reflect on this analysis with* reference to some recent systematic reviews and proposed developments [Chuang et al., 2014; Dingsøyr, 2012]

To contribute to the current debate on revisiting, reviewing and updating the SPI Manifesto.

# SPI Principles and Values

<b>Principles</b>	<b>Values</b>		
	<b>People</b>	<b>Business</b>	<b>Change</b>
1. Know the culture and focus on needs	X		
2. Motivate all people involved	X		
3. Base improvement on experience and measurements	X		
4. Create a learning organisation	X		
5. Support the organisation's vision and business objectives		X	
6. Use dynamic and adaptable models as needed		X	
7. Apply risk management		X	
8. Manage the organisational change in your improvement effort			X
9. Ensure all parties understand and agree on process			X
10. Do not lose focus			X



# This orthogonal representation is misleading

- The segregation shown in the table is misleading.
- For example: Principle 8 *Manage the organisational change in your improvement effort*, involves all three Values namely People, Business, and Change.
- Also, Principle 1 supports the People Value
- And Principle 4 supports/refers to the People Value.
- It is evident that this Principle also involves the Business Value and the Change Value.

# From PEST to STEEPLED Analysis

- Sociocultural
- Technical
- Economic
- Environmental
- Political;
- Legal
- Ethical
- Demographic

# Complexity and Multidimensionality of Software Systems and the Software Process

- Software artefacts, even small programs, are among the most complex objects that humans produce.
- Software development projects are among our most complex undertakings. Computer-based systems and information systems play a very central role in organizations while the demands on quality software-based information systems are continuously increasing.
- At the same time, as information systems become more complex more and people of various backgrounds, values, cultures and beliefs are involved within software development teams, continuous software process improvement has become necessary.
- A multiplicity of interacting and often conflicting factors can cause problems and failures.
- In order to improve the software process and, hence, the software service and product, it is necessary to understand the environment (especially the Internal factors and organizational structure and their influences on the quality of software-based products and services).

# STEEPLED

## Dimensions, External and Internal Factors

**Table 1.** STEEPLED Dimensions, External and Internal factors

<b>Dimension</b>	<b>External Factors (national &amp; international)</b>	<b>Internal (organisational) Factors</b>
<b>Socio-Cultural (S)</b>	Population growth, demographics, age distribution, career attitudes, power distance, norms, globalisation	Empowerment, career progression, bias & unconscious bias, experience, skills, knowledge sharing, multicultural teams, Social Responsibility
<b>Technical (T)</b>	Automation, rate of change, upgrades, outsourcing, R&D, innovation	Knowhow, skills, types of projects (size, complexity), experience, training, equipment, development methods, lack of skills (millennium bug)
<b>Economic (E)</b>	Economic growth, interest rates, inflation, living standards and income level, competition	Resources, salaries, purchases, income, policy on overtime
<b>Environmental (En)</b>	Climate change, ecology	Ergonomics, health and safety
<b>Political (P)</b>	Labour law, trade restrictions, sanctions, impact on health & safety, impact on education, unemployment	Organisational structure (power distance), rivalries, nepotism, shortage of staff
<b>Legal (L)</b>	Regulations, Laws: employment, consumer, health and safety, discrimination	Intellectual property, commercial confidentiality (non-disclosure agreements), whistleblowing
<b>Ethical (Et)</b>	Ethical rules, moral rights, Codes of conduct, Health and safety, Social Responsibility	Internal adherence to ethical rules, codes of conduct, training, awareness, Social Responsibility, Wellbeing
<b>Demographic (D)</b>	International upheaval (wars, national disasters, movement of people (immigration/emigration, brain drain)	Loss of organisational tacit knowledge, shortage of technical skills

# An example

- BREXIT
- **Brexit is most obviously a socio-economic and political event, but its ramifications are enormous, clearly impacting all the other dimensions of the human activity, IT and Society at large:**
- *Political Dimension:* depending on the type of Brexit it is possible that trade restrictions will affect both the UK and the EU. At the same time unemployment may rise and companies may face shortage of suitably qualified staff.
- *Economic Dimension:* living standards and income levels may be affected.
- *Environmental Dimension:* could be affected by departure from the EU common regulatory framework, and also workers' rights regarding health and safety.
- *Sociocultural Dimension:* Demographics and multicultural teams will be affected.
- *Technical Dimension:* Research and Development (R&D) funding, imports/exports of equipment.
- *Legal Dimension:* Uncertainties and conflicts arising from differences in regulations and laws.
- *Ethical Dimension:* The UK has been threatening to leave the European Convention on Human Rights, which is likely to affect its ethical standards.
- *Demographic Dimension:* The decrease/increase of population based on standard Travel/Visa Regulations will have a high impact on IT and other workforce, which could be detrimental to the work quality and software quality management. Less socio-cultural awareness due to minimized exposure to other cultures, values and norms could result in a number of conflicts and projects failures.

# Extended SPI Values and Principles

**Table 1.** Extended List of Principles and Values

<b>Principles</b>	<b>Values</b>			
	People	Business	Change	Society
1. Know the culture and focus on needs	X	I	I	X
2. Motivate all people involved	X	I	I	X
3. Base improvement on experience and measurements	X	I	I	I
4. Create a learning Organisation	X	I	I	I
5. Support the Organisation's vision and business objectives	I	X	I	I
6. Use dynamic and adaptable models as needed		X	I	
7. Apply risk management	I	X	I	I
8. Manage the Organisational change in your improvement effort	I	I	X	I
9. Ensure all parties understand and agree on process	I	I	X	I
10. Do not lose focus		I	X	
<b>11. To Fulfil Ethical Duties</b>	<b>X, I</b>	<b>X, I</b>	<b>X, I</b>	<b>X, I</b>
<b>12. Comply with Legislation</b>	<b>X, I</b>	<b>X, I</b>	<b>X, I</b>	<b>X, I</b>

Key: X = involves respective Principle  
 I = influence respective Value

# Relationship between law and ethics

Spinello [25] reminds us that the relationship between law and ethics is an intimate one, where more often (than not) what the law demands from us chimes with what our ethical duties and rights are.

However, there are instances where the relationship between law and ethics breaks down and there are unjust laws that provide no moral guidance.

Hence, in a STEEPLED analysis for SPI the values and principles does not only adhere to legal rights and duties but also to ethical responsibilities and entitlements.

# Conclusion (1)

## From Agile **v** SPI to Agile **and** SPI

- As noted, manifestos tend to have a narrow scope and are short-lived. Manifestos that have universal application and appeal (like the Communist Manifesto) stand the test of time. For instance, the enduring part of the Agile Manifesto lies, apparently, in its values, rather than the principles (which are more about “how” to work). Notwithstanding, the Agile Manifesto principles are close enough to the SPI Manifesto Principles.
- The evolution of the EuroSPI conference as a forum for sharing experiences, innovations and research ideas produced shared experience and collective knowledge that have been crystallized in the SPI Manifesto whose enduring characteristic is its ability to adapt to change.
- As we reach a decade from the SPI Manifesto’s creation, there is a professional motivation and engagement in an on-going debate and effort to review and revise the manifesto. This paper is part of this effort.
- In this paper we carried out a STEEPLED [Sociocultural, Technical, Economic, Environmental, Political, Legal, Ethical and Demographic] analysis of the SPI Manifesto. STEEPLED is a multidimensional and multi-faceted analysis technique, which can be used as a thinking instrument in a number of cases in order to elucidate and formalise uncertain points of reference.



## Conclusion (2): Proposal

Ongoing and future work is being planned to start with a validation by practitioners and academics of the resulted analysis presented herein.

Subsequently, a more rigorous and richer analysis of the SPI Manifesto will be conducted as part of the current review efforts.

# Conclusion (3): Proposal / Invitation

Further work for the SPI Manifesto aims at criticising and reflecting upon the usage of SPI Manifesto and SPI awareness in general, in academia and industry.

Invitation to academics and practitioners to participate in the planned study.

A further target is to enrich the SPI Manifesto with the addition of a *comparative and practical philosophy* level proposing suitable modifications to the principles, for enhancing communication and collaboration channels academics and between academics and practitioners.

Thank you

Questions

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