

Proposals for the SWEBOK evolution process from the viewpoint of ISO/IEC/JTC1/SC7 standardization activities

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1. Introduction

ISO/IEC/JTC1/SC7 *Software and Systems Engineering*, recognized that SWEBOK is an internationally-accepted body of knowledge in software engineering so that ISO/IEC published SWEBOK 2004 and V3 as ISO/IEC technical reports ISO/IEC TR 19759:2005 [ISO19759:2005] and ISO/IEC TR 19759:2015 [ISO19759:2015] respectively. Within SC7, Working Group 20 (WG20) *Software and systems bodies of knowledge and professionalization* in collaboration with IEEE processed their standardization and publication processes. During these processes, we encountered some issues and considered possible corresponding countermeasures.

In this paper, we recommend three countermeasures for further evolution of SWEBOK from the viewpoint of standardization within SC7: 1) Evolution process with active involvement of SC7 and WG20. 2) Alignment with ISO/IEC 24773:2008 [ISO24773] and related standards developed within SC7. 3) Eligibility criteria for knowledge areas based on market recognition such as job offers.

2. Evolution process involving SC7/WG20

During the evolution process of SWEBOK from 2004 to V3, SC7/WG20 had a chance to review and give comments on the draft since 2004 was already adopted as an ISO/IEC technical report by SC7/WG20; however, it was almost the same opportunity as that of public review. Thus, the time given turned out to be somehow short for a careful review from the viewpoint of rigorous standardization and alignment with various related standards. SWEBOK V3 APPENDIX B introduces IEEE and ISO/IEC standards supporting the Software Engineering Body of Knowledge (SWEBOK). This appendix maps SWEBOK Areas and current SC7 standards although SC7 standards developed within WG20 are not included in the mapping. Further versions of SWEBOK should include SC7 standards concepts and practices, and therefore implement a mapping at a lower granularity level.

Thus, the suggestion coming out from this experience is implementing mechanisms that support a tight and frequent interaction between the SWEBOK editorial team and SC7/WG20, from the beginning of its coming evolution process. In this way, SC7/WG20 will have permanent visibility and no-delay will come from SC7/WG20 when approving changes is required. Such interaction could be supported by a closed (or open) wiki to share ideas, get comments on-line, and process them fast. Moreover, we recommend the SWEBOK editorial committee to have a public and rigorous procedure for disposing comments given by SC7/WG20, such as an on-line (anyhow, public) notification of comment dispositions results.

3. Alignment with SC7 standards going beyond technical concepts

Alignment implies one step forward to considering concepts and practices, discussed in the former section. SWEBOK as an ISO/IEC document should be fully aligned in the future with other related ISO/IEC documents. To include concepts and practices within SWEBOK, and to align SWEBOK and SC7 standards will, for sure, require a substantial effort. However this, it is a needed job.

While standards like ISO/IEC 12207:2008 [ISO] are widely disseminated within the software engineering community, and the community is fully aware of the need to invest efforts in aligning ISO/IEC 12207:2008 and SWEBOK, other SC7 standards like ISO/IEC 24773:2008, are less known. ISO/IEC 24773:2008 defines a comparison framework for software engineering professional qualification and certification schemes by using SWEBOK as a basis for mapping knowledge areas.

This alignment must go beyond technical concepts. . For example, SWEBOK V3 (i.e., ISO/IEC TR 19759:2015), introduces that “IEEE CS has established two international certification programs (CSDA, CSDP)”. According to ISO/IEC 24773:2008, CSDA [CSDA] is closer to a qualification scheme than to a certification scheme. Both of ISO/IEC 24773:2008 and ISO/IEC TR 19759:2015 are ISO documents developed and maintained by SC7/WG20 so that these documents should be consistent.

Thus, as mentioned in the previous section, it would be beneficial implementing the mechanisms to enable a tight and frequent interaction between the SWEBOK editorial committee and SC7/WG20. It is particularly relevant in next few years since WG20 is currently revising ISO/IEC 24773:2008 into a multipart conformance standard as planned as follows. Among them, Part II and Part IV are expected to be significantly related to SWEBOK.

- Part I: General Requirements [ISO24773PartI].
- Part II: Guidance Regarding Description of Knowledge, Skills, and Competences in Certification and Qualification Schemes.
- Part III: Systems Engineering
- Part IV: Software Engineering

4. Eligibility criteria for knowledge areas based on market recognition

SWEBOK is structured into knowledge areas. Areas are, therefore, essential from a content point of view. Areas prescribe, at a high level, what the SWEBOK content will be. Also important, a message is sent to the different stakeholders and communities of interest, on which are/are not the main topics of software engineering at the time the current version of SWEBOK is published.

In previous versions of SWEBOK, the editorial committee discussed and agreed the knowledge areas in which the SWEBOK was broken down. The criterion was, following the Introduction to the Guide Section “The purpose of the Guide is to describe the portion of the Body of Knowledge that is generally accepted, to organize that portion, and to provide topical access to it”. However, “generally accepted” can be subject to interpretation. Technology cycles are shorter and shorter. Software Engineering is also concerned by this situation. Therefore, fast reaction and decision-making mechanisms are needed; however this, it should be avoided that buzzwords with not enough relevance in industry are part of SWEBOK.

As a result, it seems necessary to define a number of criteria that works as a facilitator in the decision-making process for choosing a knowledge area. These criteria may include different issues such as 1) number of job positions offered in last years (e.g., four years), 2) industrial rigor and relevance for industry, and, 3) identification of a minimum number of topics in which the area can be broke down, and that could follow some or all of the former criteria.

It is clear that agreeing and deciding the criteria will require a lot of discussions, but once convincing criteria are defined it will be possible to open the discussion of knowledge areas and area break down structure to the interested community. This will make also SWEBOK stronger in the sense that it will be possible to trace not only comments and comment disposition but also why a topic is or is not included within a given version.

5. Conclusion

In this paper, we provide three recommendations/suggestions for supporting the evolution of SWEBOK from the viewpoint of standardization within SC7, and enabling a *continuous evolution*. We understand that these recommendations can help the SWEBOK editorial committee. And the SWEBOK editorial committee finds them acceptable to efficiently increase the value of SWEBOK in collaboration with SC7 and WG20.

References

[ISO19759:2005] ISO/IEC TR 19759:2005 Software Engineering — Guide to the Software Engineering Body of Knowledge (SWEBOK)

[ISO19759:2015] ISO/IEC TR 19759:2015 Software Engineering — Guide to the Software Engineering Body of Knowledge (SWEBOK)

[ISO24773] ISO/IEC 24773:2008 Software engineering — Certification of software engineering professionals — Comparison framework

[ISO12207] ISO/IEC 12207:2008 Systems and software engineering — Software life cycle processes

[CSDA] Certified Software Development Associate (CSDA), <https://www.computer.org/web/education/certifications/>

[ISO24773PartI] ISO/IEC WD 24773-1 Software and Systems Engineering — Certification of Software and Systems Engineering Professionals — Part 1: General Requirements