1. Current status of the IEICE

The Institute of Electronics, Information and Communication Engineers (IEICE) was the first engineering institute to accept a paper of mine for publication in its journal. I still vividly recall how it came about. I had tried several times to polish and revise the draft by cutting and pasting segments of the paper. When the paper finally came out in printed form, I felt so proud that I had an urge to tell someone about what I had accomplished. I felt that I was being groomed by the institute. Later, I served as secretary of a technical committee, and as president of an IEICE society. At that stage, I thought that I was well acquainted with how the institute works. However, the IEICE has changed dramatically over the years. So, I would like, first, to report on what I have learned about the institute’s activities during my time as president-elect over the last 12 months.

Let me start with the actions taken by the institute in relation to COVID-19. The Editorial Committee of the Journal of IEICE recognized the potential impact of the pandemic early on, and published a series of articles entitled “Urgent
articles on living with the novel coronavirus.” They reported the views of opinion leaders in various industries. With numerous conferences and workshops being canceled, the Membership and Services Committee endeavored to launch webinars. The IEICE ICT Pioneers Webinar series initiated by the committee is attracting 500 to 1,000 viewers for each webinar. The Finance Committee has supported “advanced actions” that are aimed at making online sessions attractive. The institute has successfully conducted a trial of Eventln (from V-cube, Inc.), which also permits poster sessions, and is about to use it widely.

The institute is also continuing with its long-standing activities. The digital content in “Forest of Knowledge” has been accessed by more than 400,000 persons, and the IEICE’s digital library now holds some 500,000 papers. Thanks to the efforts of many people, the institute’s financial status has recovered from its former state of crisis. To reverse the trend of shrinking membership numbers, a new status of Junior Member has been introduced and the Platinum Club continues to be active. Services for supporting members have been expanded and a Thank You Party for Supporting Members was held for the first time. Meanwhile, a new issue has surfaced; namely, a decline in the number of papers submitted to the English-language editions of IEICE Transactions and an associated decrease in the number of overseas members. To solve this problem, both the Membership and Services Committee and the Editorial Board Liaison Meeting are studying ways to raise the impact factors of the English-language editions of IEICE Transactions.

I am pleased to report that, during the last 12 months, under the leadership of President Iwao Sasase, the Board of Directors, Committees, and the Secretariat have worked diligently to identify the problems and to find solutions, although their efforts may not necessarily be visible to the IEICE members.

Incidentally, when I assumed the post of president-elect, I received an explanation about various statistical charts. It was then that I became aware of a long-term structural change taking place in the IEICE. Had I not recognized this change at that point, my inaugural address would end right here, making it the shortest of any address given by successive IEICE presidents. Instead, one chart strongly claimed my attention. It showed the number of members by age.

2. Impact presented by a chart showing the number of members by age

A chart showing the number of members indicates a significant issue for the IEICE; namely, a decline in membership. Since it arises every year almost like an annual event, the sense of crisis felt by readers of the chart is weakening. However, for the first time, I saw a chart showing the number of members by age and realized that it gave a more profound message. The chart showed that the number of members at around age 30 was about one-third of the number of members at around age 55. This may be partly due to the declining birth rate and partly because there is a higher proportion of younger persons among overseas members withdrawing from membership. However, these factors cannot fully explain the large discrepancy between the respective numbers for the two age
brackets. On comparing the historical charts, I noticed that, as one year transitions into the next, the number of members in each age bracket does not shift at the same level; rather, it gradually decreases. This means that we cannot say with any optimism that, as people get older, they are more likely to join the IEICE.

It is known that predicting a population size is relatively easy. “The Limits to Growth,” a well-known projective study report by the Club of Rome, is said to have originated in prediction of future population size. It may be too much to treat the number of members just like one would population size, but the number of members by age is an important indicator in projecting the future of the IEICE. Confronted with this decline in the number of younger members, the Strategic Planning Committee launched a working group called “Reform of the IEICE for younger members by younger members.” In dialogues between the working group and the Board of Directors, young members raised a number of issues regarding the institute and presented specific ideas for improvement. A cohort of assertive younger members is vital to advancement of this institute. For example, the working group pointed out that, since incorporation of the IEICE, the workload for operating workshops has increased. In response, the Secretariat has begun studying how to solve this problem.

I asked the Secretariat (though I knew they were constantly busy) to develop more detailed charts that would show the number of members from universities by age and the number of members from enterprises by age for each IEICE society. In the IEICE, the number of members from universities and that of members from enterprises are more or less the same. Therefore, it would be reasonable to expect that, upon finding jobs in enterprises, student members will go on to become enterprise-based IEICE members. However, that was not the case. The detailed charts disclosed the institute’s long-term issues more specifically. For example, while the percentage of members from enterprises has traditionally been high in the Communications Society, it is highest at age 55 and then falls dramatically as the age level decreases. The charts indicate that it is not sufficient just to study how the institute can provide value to researchers and engineers working in enterprises; it is necessary to rebuild relations between the institute and enterprises from scratch. The Information and Systems Society has more members from universities than from enterprises. The charts show that the number of younger members from universities is remarkably smaller than the number of their older counterparts. We must identify the causes for this problem and consider what kind of value the IEICE can provide to younger researchers and faculty members at universities, who will be responsible for the future.

3. “Vertical” and “horizontal” in the era of collaboration

Some 20 years have passed since people in every sector of society began to recognize the importance of collaboration. During that period, various forms of collaboration, ranging from industry-academia-government collaborations through cross-industrial collaborations, open innovation, and ecosystems, have emerged and have been discussed. Underlying these developments is the fact that the problems confronting society have grown too complex to be able to be solved through
any one area of expertise or one industry. Another cause could be that, as the network connects the whole world, global-scale constraints have become evident. Sixteen goals in the SDGs address such social issues (the 17th goal being partnership for achieving the other goals). It is no wonder that IEICE members seek out a variety of collaboration opportunities and that their interests expand beyond their respective areas of expertise.

An academic association is a body whose purpose is to advance its specific area of expertise. The IEICE is a body in which researchers and engineers who are interested in the fields of electronics, information, and communication come together. It consists of five societies (Engineering Sciences, Communications, Electronics, Information and Systems, and NOLTA), and the Human Communication Group. Each society or group is made up of several technical committees. Some days ago, on the final day of the IEICE General Conference, there was a discussion session entitled “Candid talk about the IEICE in the coronavirus and post-coronavirus eras.” In that session, some people expressed the idea that the IEICE should place more emphasis on addressing social issues. When people have come together to share their concerns about social issues, they will find that potential solutions are not confined to their specialty areas. How should an academic association that is dedicated to a specific area of expertise deal with this dilemma?

Take universities, for example. Faculties and departments in universities are delineated according to respective areas of technical expertise. A vertically structured organization is certainly suitable for research activity, but what is required for education is to cultivate the ability to develop interdisciplinary solutions. In other words, times are changing from an era in which both research and education are vertically organized to one in which research is organized vertically but education cuts horizontally across different disciplines.

Copenhagen Business School (CBS) is a successful case of proactively adapting to this change. CBS is a large commerce-focused university with 20,000 students. Over the last 25 years, the number of undergraduate and master’s courses has tripled, accompanied by a 2.5-fold increase in the number of students. This has resulted from the efforts to increase the number of interdisciplinary educational programs in order to respond to societal demands. What is noticeable is that the increase in the number of faculty members to support the greatly strengthened “horizontal” educational programs has led to reinforcement of the research capabilities of the “vertical” departments to which the faculty members belong. Taking a cue from CBS, I would like to suggest that the IEICE expand its interdisciplinary collaboration. These will make the institute more attractive and help to grow the number of members belonging to IEICE societies and technical committees.

These days, we frequently hear people refer to an “ecosystem” to describe a strategic collaboration for creating a new business field. They are drawing an analogy between a biological ecosystem in nature and business collaboration. The term is often used to describe a flexible collaboration made possible by sharing data. For example, people say, “Amazon is no longer a company; it is a complex ecosystem.” Come to think of it, an academic association is a body that
collects information from its members, and supplies carefully selected information to society. Again, I take a cue from the idea of “ecosystem” and suggest that the IEICE make the most of its wealth of scientific information to establish collaborations both internally and with other academic associations, as well as collaborations that are open to society at large.

4. Three proposals for the era of collaboration

What should the IEICE aim at in the era of collaboration? While serving as IEICE president-elect, I consulted with the Board of Directors and the Secretariat about preliminary ideas. Let me introduce three that have received comparatively positive responses.

(1) Bundling scientific media contents through collaboration among academic associations

With accumulation of media content, such as webinars, accelerating, how about having multiple academic associations cooperate to bundle scientific media contents and provide them?

The IEICE has been cooperating with the Institute of Electrical Engineers of Japan and the Japan Society of Mechanical Engineers. These societies now jointly plan special issues in their respective journals and hold joint conferences. Also, the IEICE Information and Systems Society has worked with the Information Processing Society of Japan to jointly host the Forum on Information Technology (FIT). In addition to joint planning of such research gatherings and publications, we could consider collaboration on provision of media contents. According to the information economy, the marginal cost of information goods is virtually nil (i.e., the reproduction cost is zero). Hence, new strategies for information provision has been developed. In particular, bundling of information goods is a promising strategy. In the case of music, for example, bundling does not impose a heavy processing load on the server because, even if millions of songs are bundled, a typical user cannot listen to so many, and thus the processing load on the server does not increase in proportion to the number of songs bundled. Advantages of bundling are that it can satisfy the interests of a wide variety of users and that there will be (to be blunt) no consumer surplus because the prices that users are willing to pay converge. Consequently, it is more efficient for musicians to sell their songs through a bundling company than to self-market them. The result is that information goods continue to accumulate.

The same can be said about scientific media contents provided by academic associations. If several associations cooperate to bundle their contents, they can satisfy the demands of researchers and engineers who have taken an interest in this or that field, and even meet public demand. They can potentially make more profit this way than through providing contents independently.

(2) Creating “IEICE Review” to publicize members’ activities to the world

How about creating a new publication (provisional title: “IEICE Review”) that describes remarkable activities carried out by members and transmits that information globally?

This would be, in a sense, a publication version of the successful webinars provided by the IEICE.
Potential contents could be summaries of specialized knowledge, monographs giving overviews of a series of researches that have taken several years, and explanations of R&D programs conducted by enterprises. Unlike ordinal journals, no table of contents would need to be provided, and articles that have been peer-reviewed could be promptly published by electronic means.

The idea of publishing monographs occurred to me when I was serving as a research supervisor for the Precursory Research for Embryonic Science and Technology (PRESTO) Project of the Japan Science and Technology Agency. While I was amazed at the achievements of young faculty members and researchers in producing excellent research results and bringing them to social implementation, I realized that they did not have representative publication (e.g., single-authored paper in an English-language journal). These days, young faculty members have to seek research funding and educate doctoral course students on their own. The result is that, while they publish numerous conference and journal papers, most of these are co-authored. Even in a representative paper, the main author is sometimes a student. This publication strategy may be successful in the short term but, over the long run, if one wants to be the main player in international collaboration, he/she needs to have a representative paper under his/her name. However, because their research results have already been published in various places, they cannot write original papers anymore. A way around this is to write a single-authored monograph that summarizes a research project that the individual has personally conceived and led.

Those who have led R&D projects at enterprises should also be keen to write articles that explain their projects. In academic papers, an overall picture of the project cannot be given; rather, it is required to generalize the obtained knowledge and insight. In a monograph, however, the experiences under special conditions can be described. It is meaningful for both the central project players and society to have records of highly rated projects.

(3) Creating “IEICE AdHoc” to support collaboration among members

How about establishing a flexibly operating forum in which anyone can participate on a casual basis (provisional name: “IEICE AdHoc”) to support a wide range of activities carried out by members who are living and working in the era of collaboration?

Declining membership is a problem being experienced not only by the IEICE but also by several other academic associations. The IEICE is a central academic association in respect of the IoT and AI. If research and development in these fields are not winding down, then the decline may suggest that the IEICE is failing to embrace the activities of those researchers and engineers who are pursuing these leading-edge technologies. “IEICE AdHoc” could become a forum for supporting younger members in learning new technologies, such as machine learning, and in collaborating with startup companies. It could also be a forum for supporting older members, the main segment of institute membership, in pursuing academic-industrial alliances or in cooperating with the government and NPOs to address societal problems.

Such a framework would need to be simple and transparent. If it is complex and difficult to access
without some prior investigation of its mechanism, potential users will be unenthusiastic about or uninterested in starting to use it. Activities resulting from use of “IEICE AdHoc” may not be as well-ordered and methodical as those of existing technical committees. Activities in AdHoc may overlap. Accordingly, it is as important to tolerate a certain degree of diversity and confusion as it is to make the framework simple. It would be great if establishment of such a flexible forum should lead to the kind of IEICE through which both younger and older members can pursue freewheeling activities.

5. Driving transformation of the IEICE

Various committees of the IEICE have discussed many ideas about reform of the IEICE, including those proposed in this article. I hear some complain “There are enough ideas. The question is who will commit to implementing them?” In that respect, all members of the Board of Directors and committees are volunteers and the Secretariat is small. The number of people involved in operation of IEICE general conferences, society conferences, and more than 80 technical committees is also small. The aggregate power of these people is not sufficient to transform the institute’s long-standing framework, built over its century-long history.

Therefore, the first requirement is to reinforce the workforce of the Secretariat. Already, activities have been initiated whereby a group of graduate student volunteers has been organized to participate in operation of the IEICE while also developing next-generation communities. The Strategic Planning Committee is discussing creation of a new organization to implement transformation of the IEICE.

It takes time for a democratically operating institute to make a decision. However, the evolving society will not wait for us. As president of the IEICE, I will work diligently toward attaining the goals of rebuilding relations between the IEICE and enterprises, reviewing the needs of researchers and engineers, and supporting freewheeling activities by its members. I ask for the support and cooperation of IEICE members in the pursuit of these objectives.