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Yuji Ijiri: Accounting for a Better Society

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Shyam Sunder, Yale University

Abstract

Yuji Ijiri was a polymath and pioneer who gave us better understanding and methods of accounting and management. His theories of measurement, aggregation, and double- and triple-entry bookkeeping built an enduring foundation for the discipline and practice of accounting.

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At this celebration of life, let us all, especially his students, recall what Professor Ijiri added to the practice and theory of accounting and management, and how he thought, lived and taught. His life permeates my everyday life as hardly a day goes by without my asking myself: What would Professor Ijiri do in this situation? We also need to reflect on what Professor Ijiri's teachings mean for the future of accounting. In these few minutes, I shall touch on these topics, but focus on the last, because that is what matters most. History matters because it helps to determine our future, as we know from Professor Ijiri's defense of historical cost as the foundation of accounting. He personified Rabindranath Tagore's Bengali poem *Ekla Chalo Re* (in translation below) and was perfectly willing, as great people are, to walk alone.

*If they answer not to your call, walk alone,
If they are afraid and cower mutely facing the wall,
O thou unlucky one,*

¹ An earlier version was presented as a Memorial Lecture Honoring the Legacy of Professor Yuji Professor Ijiri at Tepper School of Business, Carnegie Mellon University, Pittsburgh, PA, USA on May 13, 2017.

*Open your mind and speak out alone.
If they turn away, and desert you when crossing the wilderness,
O thou unlucky one,
Trample the thorns under thy tread,
And along the blood-lined track travel alone.
If they shut doors and do not hold up the light when the night is troubled with storm,
O thou unlucky one,
With the thunder flame of pain ignite your own heart,
And let it burn alone.*

(Translated into English prose from Bengali original by Tagore himself)

Professor Ijiri's thoughts were not constrained by any one conventional academic discipline. His contributions broadly span the subjects of linear algebra, logic, statistics, economics, gaming, finance, marketing, operations research, physics, psychology, industrial organization, and several other fields. Yet, he still had enough intellectual energy to axiomatize accounting; to discover, articulate, and explain its basis in historical costs and its essential function in the service of organizations and society. But most of all, Professor Ijiri like other great scholars, aspired to do things better. Before I return to that topic however, let me briefly sketch some of his early contributions in aggregation theory.

In his 1971 *Journal of American Statistical Association* paper "Fundamental Queries in Aggregation Theory", Professor Ijiri asked: How are functions of aggregates related to aggregates of functions? What are the determinants of these relationships? On what basis can we assess, evaluate and choose from alternative functions and aggregations? This problem arises not only in accounting, financial valuation and income measurement, but also in production functions, utility functions, input-output analyses, index number theory, dynamic linear systems, information theory and statistical aggregates.

The conditions for total consistency between functions of aggregates and aggregates of functions are so narrow that they are rarely fulfilled. Partial consistency—whether constrained, filtered, or characteristic—is the most one can hope to achieve. The degree of correspondence between the two aggregates can be assessed by various statistical criteria such as bias, squared error, or entropy, depending on the loss function appropriate for the application at hand.

Professor Ijiri suggested that the collection of a micro-system, a macro-system, and an aggregation function, considered as a set, is generally over-identified, and the appropriate way of resolving the problem depends on the context. This, he had already begun to do in his earlier 1968 *Econometrica* paper titled “The Linear Aggregation Coefficient as the dual of the Linear Correlation Coefficient.” He showed that “the difference between the correlation and the aggregation coefficient lies only in the interpretation of the underlying space R^n . If R^n is interpreted as data space, ρ is the correlation coefficient, if R^n is interpreted as function space, ρ is the aggregation coefficient.” This analysis arose from his work on accounting valuation, which had appeared a year earlier in his Ford Foundation monograph, *The Foundations of Accounting Measurement*. If I may add, these results became the inspiration for my own work on interactions between aggregation and measurement errors in accounting valuation during the eighties and the nineties.

Let me return to what Professor Ijiri’s legacy means for the future of accounting. In the graduate education curriculum at the Graduate School of Industrial Administration (GSIA), it was stressed that making our world a better place demands dedication and great effort in both body and mind. GSIA furnished the language of life-long learning and problem-solving that pervades Carnegie Mellon University. “Striving” is how Richard M. Cyert—professor and dean

of GSIA, and president of Carnegie Mellon—characterized it. This tenet drove this youngest of the business schools to search and establish its novel pathway through largely untrodden territory to improve management. Research was the byproduct of solving management problems, not the other way around. Years after leaving GSIA, I happened to ask William W. Cooper, one of the three great founding faculty of GSIA, and Professor Ijiri's mentor: "what do you do when a firm asks for consulting services?"; "It's simple," he said, "when somebody comes to me with a problem, I ask myself: Do I know how to solve the problem? If the answer is yes, I give them the contact of one of my students, because I have taught everything I know. If the answer is no, I accept the assignment; it is consulting for them, and research for me."

The young Professor Ijiri entered this beehive for forging new solutions to problems of management in 1960 at Carnegie Mellon University (CMU) and thrived here for his entire career (except for four years at Stanford). Only a decade earlier, the Carnegie Institute of Technology had led the way to a novel approach to engineering education. Its provost had sought to expand the problem-solving approach to management with the support of philanthropist William Larimer Mellon and three young revolutionaries—economists George L. Bach and William W. Cooper and political scientist Herbert A. Simon. They went on to rescue management education from the "wasteland of vocationalism" (as Ford Foundation labeled the prevailing business schools) while recommending CMU's model to others. This new approach to education combined three elements—a foundation of quantitative, economics, and psychological knowledge, its use to solve actual problems of management, and research. The first and the third elements had been largely absent from business school education until the mid-twentieth century.

Even a cursory glance at Professor Ijiri's oeuvre leaves little doubt of his steely commitment to leave a better world behind him. He was no ivory tower academic, and (during my student years 1970-73), was rarely found at the campus on Wednesdays. Of course, Carnegie had created a school of industrial administration to introduce social sciences and quantitative analysis to rescue it from the sterile vocationalism of the first half of the century. Professor Ijiri devised and used advanced quantitative methods and social sciences to improve the practice of accounting and management. He spent Wednesdays at his Gulf Oil office downtown discovering and addressing real problems of managing, and of making public policy. Papers and publications were not the goal but a consequence of this pursuit of problems, as he showed us through his personal example. No professional discipline like accounting can have a future without addressing the problems of society, simply writing and publishing papers as a goal had little meaning to him.

My first memory of Professor Ijiri is in the Financial Controls class I took as an MSIA student in fall 1970, which Ilker Baybars and John Heinz (later U.S. senator) also attended. A year earlier, GSIA had introduced the mini-semester system. In the dozen 110-minute classes he had been given to teach accounting, Professor Ijiri took time to share his current thinking. One day, he drew a U shaped curve on the blackboard with income (on the y-axis) and the two opposing forces of managerial incentives to increase income and of conservatism to keep it down (on the x-axis). This was a completely novel perspective on the behavioral and economic dynamics of accounting for me – and, in that single instant, Professor Ijiri hooked me on the promise of accounting as a deep intellectual discipline, without even knowing, much less trying to.

My second oldest memory of Professor Ijiri is when I knocked at his office door during a lunch hour and found him bent down over a low table across from his colleague Terry Gleason. The table held a square board divided into hundreds of smaller squares, some of which had small round grey pieces on them. I later learned that Yuji and Terry often used their lunch hour to play a game of *Go*, a game whose depth remained unfathomed by artificial intelligence until just recently. Professor Ijiri loved games—all games—and gadgets. I cannot remember any time he did not have the latest gadgets in his hands, starting from Hewlett Packard (HP) calculators in 1972. These HP calculators with their Reverse Polish Notation or RPN fascinated him, and sure enough, he published a paper about it. Everything in life was a game and a source of fun; work was often a rewarding byproduct. I would be surprised if he is not having just as much fun now, as he did in the years he shared with us.

On a personal note, I arrived at GSIA after Bernard Goldsmith let (me) an applicant without a formal undergraduate degree into the master's program and gave me a loan to cover the \$2,250 annual tuition. In the middle of the fall semester, the faculty allowed me into the PhD program where Professor Ijiri, Robert S. Kaplan, Edward Prescott, and Richard Roll guided me. I will never forget the kind, gentle support and welcome smile of Mrs. Tomo Ijiri that made it all seem so easy. I thank you, Tomo, and Yuji Ijiri for giving me the inspiration to pursue this rich, meaningful life full of ideas and fun.

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