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Editorial: Evidence-based science

The title of this editorial may seem tautological—the term 'science' derives from the Latin word *scientia* meaning knowledge, or the pursuit of knowledge, and knowledge is based on verified evidence. Nonetheless, we often come across such terminology—or one of its many variants (for example, evidence-based medicine, evidence-based decision making, and even evidence-based management)—in academic settings. Is it not obvious that science is based on evidence? If it were not, why would it be called science? After all, academic journals are supposed to publish scientific articles based on sufficient evidence for the claims they present—re-enforcing the obvious just seems tautological. This editorial attempts to address this perceived tautology by digging deeper into the meaning of evidence and the way science is developed.

Evidence is simply anything that supports a statement or assertion. In law, the phrase 'admissible evidence' defines the types of evidence that are acceptable in the proceeding—the quantity and quality of evidence necessary to meet the legal burden of proof are also specified. In medicine, evidence-based medicine has dedicated journals—for example, the 'Aims and Scope' of the journal *Evidence-Based Medicine for Primary Care and Internal Medicine* read as follows (EBM 2013):

> *Evidence-Based Medicine* [(EBM)] systematically searches a wide range of international medical journals applying strict criteria for the validity of research. Experts critically appraise the validity of the most clinically relevant articles and summarize them including commentary on their clinical applicability. EBM also publishes articles relevant to the study and practice of evidence-based medicine.

In a decade-old article in the same journal, Porzsolt et al. (2003) outlined a six–step approach to synthesising internal and external evidence for better health-related decisions. Internal evidence is the knowledge accumulated through formal education and training as well as through experience gained in daily practice or in individual clinician–patient relationships. External evidence consists of research results of randomised controlled trials—for example. It is therefore the combination and explicit contrast between internal and external evidence that elevates clinical decisions to evidence-based decisions. Conflicting internal and

external evidence leads clinicians to revisit one or the other—or to involve the patient in the decision-making process, as recommended.

Key to evidence-based medicine is the categorisation—or rating—of evidence, on account of freedom from bias. The strongest evidence is derived from multiple trials that are randomised, triple-blind, placebo-controlled with allocation concealment, and complete follow-up with homogeneous patient population and medical condition. Due to inherent bias, expert opinion, patient testimonials, and case reports are inevitably at the bottom of such hierarchy.

Perhaps less explicitly, fields other than medicine make similar attempts to increase the validity of research findings. They gather internal evidence through literature reviews, observations, case studies, or surveys, while meta-analytic studies tend to summarise available external evidence. Unlike medicine or physical sciences, the mechanisms—or the information available to evaluate the strength of evidence—are largely missing in management. There is no management equivalent for the medical trials which act as prime source of external evidence by serving as exact replications to verify and validate the findings of the original study.

In social sciences there are two types of replications—exact replications (replications with extensions included) and conceptual replications (Thomas and Rosquist 2003: 11). Exact replications—where the original study is repeated in every detail to verify the original results—are rarely pursued in management. The most common conceptual replications use different measures or conditions—different data sets, for example—to test the same or similar hypotheses. Conceptual replications are predicated on the idea that the effect—if large enough—will reoccur under different conditions. However, non-reoccurrence may be due either to the spurious nature of the effect or to the changes in research design. Consequently, conceptual replications open up a Pandora's box of issues, including the highly dubious 'inadequate treatment fidelity', where the failure to replicate results is attributed to improper implementation of research methods reported in the original paper—an argument that contradicts the large effect size-based foundation of conceptual replications.

The idea behind exact replications can be attributed to Karl Pearson, one of the great statisticians of the Twentieth Century, who issued the following challenge during a heated academic debate (Thomas and Rosquist 2003: 8): '[i]f a serious question has been raised, whether it be in science or society, then it is not enough to merely assert an answer. Evidence must be provided and that evidence should be accompanied by an assessment of its own reliability.' Statistics should be placed on the table for everyone to see, he argued—a recommendation not always followed in management, but without which the discipline has a long way to go to reach the level of an evidence-based science (Vastag et al. 2012).

The current issue of *Pannon Management Review* follows this recommendation to make management evidence-based (some pun intended). The first three articles link management and medicine by investigating management issues related to healthcare. **Thomas Lynch** and **Roderick Martin** examine healthcare systems from a macro perspective, while **Ágnes Lublóy** summarises current thought and reflects on managing the diffusion of pharmaceutical innovations. The last two articles explore the pursuit of knowledge through the turns and twists of PhD education. Preceded by an introduction by **Roderick Martin**, **Howell John Harris** gives a thoughtful and enlightening account of the beginning of his illustrious career as a business historian.

'For-profit Healthcare: A Lesson from Canada' by **Thomas Lynch** provides interesting bases for comparison with other healthcare systems—including Hungarian, where a (largely) not-for-profit system is mixed with for-profit elements—as well as possible lessons. The case discussed in this article is in the Canadian Province of Alberta, where private for-profit services were introduced into the public not-for-profit system, mostly on efficiency considerations.

Roderick Martin—in 'Recipe for Permanently Failing Organisations? Private Provision in Publicly Funded Healthcare'—discusses the potential impacts of the 2012–13 changes to the English National Health Services (NHS). Similarly to the Canadian case, the idea behind these changes is to enhance the role of market principles. However, because of a number of factors, the end result may be just a 'permanently failing organisation'.

Both these articles are very relevant for the reform of the Hungarian healthcare system—I hope we shall explore the issues presented here further in the near future.

Ágnes Lublóy—in 'Managing the Diffusion of Pharmaceutical Innovations: Conclusions from a Literature Review'—gives an overview of the quantitatively measurable and qualitatively accessible factors that influence new drug uptake in both primary and secondary care. It is perhaps understatement that the diffusion of pharmaceutical innovations is a very complex process. As her article shows, early adoption of new drugs is the result of multiple actors and multiple interactions that include the prescribing behaviours of doctors, their social networks, and the strategies and actions of pharmaceutical companies—all in a complex institutional setting of healthcare policies and regulations.

In the current issue of the journal, 'Young Scholars of Yesteryears' replaces our usual 'Young Scholars' Platform' to allow a few words of wisdom from two of those who have already 'been there and done that' successfully—**Roderick Martin** and **Howell John Harris**, who found themselves in a supervisor–supervisee relationship a mere 30–40 years back.

In 'Introducing Business Historian Howell John Harris', **Roderick Martin** discusses three fundamental prerequisites for successful PhD research: (1) pursue a

PhD if you have the drive and reason to do it—do not pursue a PhD just as a substitute for other options; (2) have a topic you are seriously interested in; and (3) pick your supervisor wisely. In my view, they should be made explicit in all PhD programmes and to all PhD applicants.

Howell John Harris recounts the beginning of his famed career in '"The Path I Trod": A Portrait of the (Business) Historian as a Young Idiot'. This is a highly personal, honest, self-deprecating, and entertaining account—with lessons for everyone in academia independently of the field studied—going back to times when Detroit could be found 'aesthetically exciting', in more ways than one.

Viewed through the lenses of this particular editorial, the articles presented here may be classified either as replication studies on the same question in not so dissimilar macro environments—**Thomas Lynch** and **Roderick Martin** are addressing the same problem of mixing a not-for-profit healthcare system with for-profit elements in Canada and, respectively, England—or as a source of external evidence—**Ágnes Lublóy**'s article provides external evidence from the literature on the diffusion of pharmaceutical innovations.

At their core, academics are evidence collectors—they build knowledge through amassing evidence from various sources. This is a 'trade' with its own rules, crafts, and even tricks, as well as with its own hierarchy—everyone starts at the bottom as doctoral students, and some rise to the top and become professors like **Roderick Martin** and **Howell John Harris** did. By sharing the story of how it all started, they are enlightening—I hope—many would-be evidence collectors.

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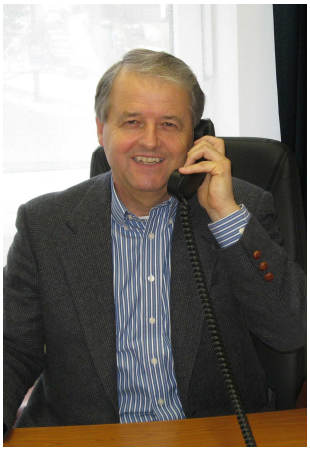

Gyula Vastag is Professor with the Faculty of Business and Economics, University of Pannonia in Veszprém, Hungary. He served as Managing Director of the Corvinus School of Management at his *alma mater*, Corvinus University, and as Professor and Area Coordinator of Operations and Supply Chain Management at the Central European University (CEU) Business School, both in Budapest, Hungary. In the US, Gyula spent almost two decades on the faculties of Kelley School of Business (Indiana University), Eli Broad Graduate School of Management (Michigan State University), and Kenan-Flagler Business School (University of North Carolina at Chapel Hill). In addition, he was Professor and Dean of Supply Chain Management Programmes at the University of Stuttgart (2000–2001), where he has been a visiting professor ever since. He also held a visiting professorship (part-time) with the University of Groningen in the Netherlands.

Gyula earned his PhD and Doctor of Sciences degrees at (the predecessor of) Corvinus University and the Hungarian Academy of Sciences respectively, and finished his habilitation at Corvinus University.

His areas of interest include global operations and supply chain management, service operations management, and environmental management strategies. A successful and popular instructor, Gyula has developed and taught a wide variety of conventional and unconventional courses and educational programmes, both in business schools and for corporations—such as for the Kelley Direct Online MBA Program (Indiana University) and the action-learning programme for the executives of the largest bank in Central and Eastern Europe.

Gyula co-authored two books, wrote eight business cases, and contributed chapters to 15 books. He published over thirty peer-reviewed journal articles, in the US and Europe, and numerous papers in conference proceedings. The h-index of his publications in Harzing's *Publish or Perish* (based on over 1,000 citations) is 15 (as of 14 October 2012). His work on the competitiveness of metropolitan areas has generated interest outside academic circles, and his cases on Sonoco's take-back policy were selected by CaseNet® as two of the six e-link cases for the seventh edition of Meiners, Ringleb, and Edwards' widely used *Legal Environment of Business*.

Gyula has cooperated and consulted with a large number of organisations, including the Aluminium Company of America (Alcoa), the Carlson School of Management at the University of Minnesota, the Global TransPark Authority of North Carolina, the US Federal Aviation Administration, and the North Carolina State University, in the US; the International Institute of Applied Systems Analysis, in Austria; ESSEC-Mannheim Business School, in Germany; Knorr-Bremse Hungary and the OTP Bank, in Hungary; and the International Institute for Management Development (IMD) and the University of St. Gallen, in Switzerland.

Gyula is Member of the Executive Board of the European Decision Sciences Institute (EDSI) and the Vice-President for the European Division (2010–14) of DSI, where he is also Member of the Development Committee for Excellence in the Decision Sciences, the Nominating Committee, and the Strategic Planning for International Affairs Committee as well as Chair of the Member Services Committee (2011–14). He is Founding Member of the Global Manufacturing Research Group, where he also served as Associate Director. In addition, Gyula served on the Executive Committee of the International Society for Inventory Research in 1998 and 2006, and he is currently Member of its Auditing Committee.

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