Dr. Alice Pitt, Vice Provost Academic
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Dear Dr. Pitt,

It was a pleasure to serve on the external reviewing team for the proposed Master of Management in Artificial Intelligence (MMAI) program at the Schulich School of Business, York University. The review involved studying the program in detail, evaluating the credentials of the faculty supporting the program and on-site discussions with key stakeholders.

Overall, we are enthusiastic in supporting this program and believe it is very timely, designed well and supported well by a talented and energetic team of faculty and university administrators. There are not many programs that are similar to this – a strength of the program – hence, direct comparisons are difficult. However, the program appears to deliver on its learning outcomes and goals. In this letter, we offer comments and feedback based on the external appraisal report criteria outlined in the York University Quality Assurance Procedures. Details are as follows.

Outline of the Visit

During our visit to the Schulich School of Business on Monday, January 7th, we were fortunate to engage in lively discussions with the following:
- Academic Vice Provost and Dean of Graduate Studies at York University
- The Dean and Associate Dean of the Schulich School of Business
- Faculty members of the MMAI task force and other full-time faculty and part-time instructors that will be involved with the program
- Current students enrolled in various undergraduate and graduate degree programs at Schulich
- Staff members that support the admissions, student services, career development, and library functions

As part of the visit, we also toured facilities at the Schulich School of Business, including classrooms, computer labs, meeting rooms, and the new Schulich Deloitte Visual Cognitive Analytics Lab.

General Objectives of the Program, Need, and Demand

The primary objective of the program is to place students in AI-related managerial positions in the private, public, and non-profit sectors. This objective is well-aligned with the Schulich

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School and York University's broader mission. We believe the program name and degree designation are appropriate and consistent with the curriculum, student learning objectives, and program-level goals.

With respect to need and demand, the program is closely aligned with the Vector Institute's 1000AIMS initiative, which supports Ontario's goal of producing 1000 graduates annually in the field of AI within the next five years. In addition to serving demand in the local Ontario region, based on our discussions with faculty and staff at Schulich, there is a sense that the prospective student pool and employers pertaining to the MMAI program are both geographically much broader, encompassing high AI-growth markets such as North America, Asia and Europe. Given Schulich's strong global footprint, MMAI seems well-positioned to cater to the supply and demand needs of such a wider geographic market.

Program Content, Curriculum, Structure, Learning Outcomes

On the curricular side, the design of the program has been thought through quite systematically. The coursework includes a combination of technical and managerial content. Unlike programs that separate out technical and managerial content into separate courses, it was refreshing to see that many of the proposed courses actually had these two components integrated within the course itself. The two-semester project course will also allow the students to apply the knowledge from the courses into real-world applications. It was particularly refreshing to see companies that have already signed-on to participate in these projects with commitments of approximately $25K toward supporting the projects. Great execution of these project courses will require close involvement with industry partners and it appears that the program has been designed with such close interaction in mind. Further, Schulich's close connections with leading firms and executives is a major plus for this program.

Also on the curricular side, it was encouraging to see that the content provided by the program can position students for a broad range of opportunities in the field. Courses in AI, algorithms, data science, databases, numerical analysis, visualization, NLP coupled with case analyses and business foundations (through additional electives) will provide Schulich students with a broad background in the field to pursue opportunities in many different areas. The ethics of AI course is in particular an important component and appears to be positioned well (early) in the program to help students understand the societal and people impact of AI.

We do have a few suggestions on the curriculum that we discuss in our recommendations.

Resources

We were equally impressed by the quality of the faculty supporting this program. Many of the courses, while new, appear to have existing faculty who can cover them. Based on our discussions and examination of bios/CVs, these faculty clearly have a wealth of expertise on relevant topics such as the foundations and theory of AI and machine learning, as well as the state-of-the-art tools, techniques, and practices. Overall, the program appears to have a good

mix of full-time tenure stream research faculty and part-time faculty with active involvement in industry. MMAI's faculty composition seems consistent with what is found at other top business school degree programs, with over 50% of the content delivered by full-time faculty, while actively leveraging knowledgeable practitioners with strong academic credentials and teaching experience. This mix will be essential to ensure that the program offers insightful perspectives from both the research as well as the applied angles – academic rigor coupled with industry relevance. The plan to hire two additional faculty members (approved by the President as part of the college's three year plan) will also be a significant plus in terms of offering additional faculty resource support for this program.

The program also appears to leverage existing staff expertise and resources needed to fuel a successful launch. Further, the incorporation of one or two new staff members for this program (as noted in the proposal) will help from a student success perspective.

We do have a few suggestions on the need for greater staff-side resources (see recommendations for details).

Quality of Student Experience

By incorporating a nice mixture of full-time and part-time faculty, the two consulting courses, and several options for the two elective courses, the MMAI program is well-positioned to ensure the intellectual quality of the student experience. Based on our discussions with the students we do have some recommendations, noted below, to further enhance this.

Recommendations

As part of our review we have some specific recommendations for the leadership to consider. While the program as proposed is ready for launch and none of these are required changes, we believe that they can further strengthen what appears to be a very well thought-through program. These recommendations are:

Curriculum-related:

1. _Explore a business foundations "boot camp."_ One of the limitations of any specialized Master's program is not being able to offer a breadth of courses in all the functional disciplines. This is quite common among most of the specialized Master's programs we have seen across the world. However, the MMAI graduates will still need a broad grasp of important business concepts in finance, accounting, strategy & management, marketing, operations and information systems. Currently, the coursework does integrate many of the business skills into specific courses; hence students do get some exposure. However, augmenting this with directly delivered content in these areas in the form of a one-week long intense boot camp at the start of the program may better align curriculum with the managerial learning objectives and positioning of the program. The faculty will need to decide which topics across the functional areas are important to cover in the boot camp since an exhaustive overview is infeasible. The

boot camp itself can then be designed as a "30-40 hour mini-MBA" prior to the start of the specialized Master's program. It is important to note that the boot camp idea is by no means the only way to incorporate the necessary business foundations content into the curriculum. We simply suggested it as one relatively easier approach for onboarding diverse student populations to create an appropriate baseline of business knowledge without significantly disrupting the rest of the program design.

2. *Consider injecting content related to Enterprise AI.* One of the missing pieces in the content was an overview of enterprise AI architectures. Today AI systems combine software, hardware, the cloud and people & processes to deliver real-time solutions. AI is an important consideration in enterprise-level digital transformation at the intersection of datafication, platformization, consumerization, and democratization. As one example, much of the revolution in self-driving cars has been supported by novel internet of things (IoT) hardware and architecture frameworks, in addition to data-driven algorithms. This broader discussion of current "architectures" in AI, and how AI relates to enterprise digital strategy, will provide students with the necessary perspective pertaining to real-world enterprise AI solutions. We don't see the need for a new course on this topic, but recommend the addition of a module in one of the existing courses that addresses this gap.

3. *Add a full-time faculty member to the AI fundamentals course*. Presently, this course is being taught entirely by part-time faculty with impressive industry experience. We're all products of our experiences – practitioners are often biased towards more recent trends and phenomenon. Full-time faculty involvement in this course can help ensure that students have a more balanced perspective on the fundamental theories and practices of AI.

Resource-related:

4. *Add a staff person to identify capstone projects and manage corporate relations*. We recommend hiring a new staff member for program support. The staff member can help identify capstone projects and manage corporate relationships. This is a common staff position/role in most specialty master's programs involving multi-semester corporate sponsored capstone projects. The corporate partner acquisition funnel, coupled with the immense communication and coordination costs needed to manage the relationship, necessitate staff support. In the absence of adequate staff support, these tasks can take up valuable faculty/program director time that would be better utilized supporting student efforts toward the successful execution of these projects.

5. *Consider providing the student body a modest budget to plan events.* We recommend the student body (see below) be provided a small budget of their own to plan events, speaker series or workshops to enhance the quality of the student experience. While we explain the rationale for this further below, the budget for these activities itself can be relatively modest to start with and can grow based on how the program chooses to manage these activities.

6. *Closely monitor the Ethics in AI course for continuity, quality, and consistency*. The Ethics in AI course is a particularly important course in the program and is the only one taught from outside the college of business. This course is currently slated to be taught by a post-doctoral scholar, funded in part by the college of business. We recommend having a clear long-term plan for how this course will be funded and supported, as well as how quality and consistency will be maintained. This non-business post-doctoral scholar may enrich student learning outcomes, but better explicating the plan will help ensure the long-term viability and quality of the course.

Quality of Student Experience-related:

7. *Consider forming a program-level student body.* We recommend forming a program-level student body that can serve as liaisons to the faculty with the broader goal of enhancing student experience. We envision this body taking the lead in organizing speaker series, or workshops, related to AI that can provide a constant stream of cutting-edge content from AI industry practitioners. Some of the speakers solicited may even "skype in" or provide short talks to the students through teleconference facilities, thereby opening up a vast range of global expert resources that can be tapped into. While such experiences can enhance the quality of student experience in any program, they are likely even more important in an area like AI where rapid advancements are being made constantly in industry as well. The idea of having a student body lead these efforts was motivated by three factors. First, external speakers sometimes respond more favorably when contacted directly by students rather than staff. Second, these "self-arranged" events will likely have better attendance among students. Third, it will place less stress on limited faculty and staff resources.

Thank you for the opportunity to serve as part of the external review team and best wishes for a successful launch.

Sincerely,

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