CONCLUSION 結論

In chapter 2 I referenced a diagram that represents a theoretical ideal of how the integration of PLM with other systems should be (Figure 74). In that diagram the reader can notice that ideally PLM would be the center of the system with other systems (Including ERP) attached to it. Different from said diagram the Odoo software takes ERP as the center with other systems attached to it. This work has shown that it is certainly possible to use Odoo for PLM and MES however it has also shown that the PLM and MES implementation presents some weaknesses.

在第 2 章中，我引用了一個圖表，它代表了 PLM 與其他系統整合的理想情況（見圖 74）。在該圖表中，讀者可以注意到，理想情況下，PLM 應該是系統的中心，其他系統（包括 ERP）都連接到它上面。與該圖表不同，Odoo 軟件將 ERP 視為中心，其他系統連接到它上面。這份工作已經表明，確實可以使用 Odoo 進行 PLM 和 MES，但同時也顯示了 PLM 和 MES 實施存在一些弱點。

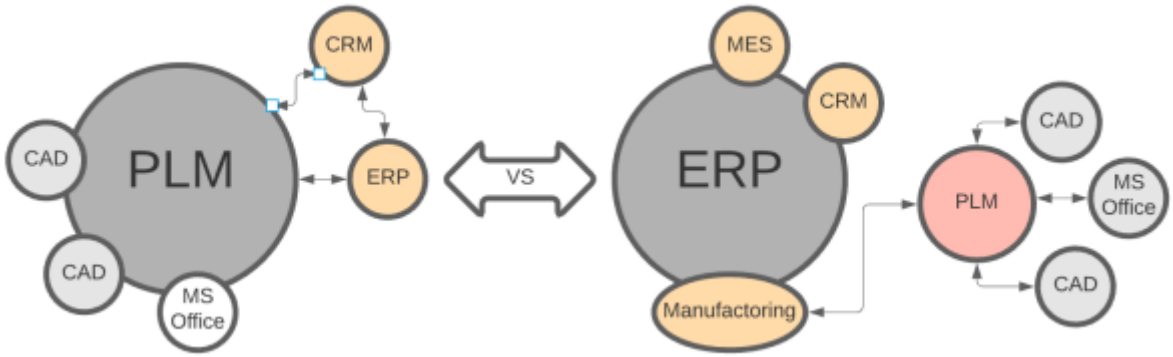

Figure 74 Comparison to the left the adapted diagram as theorized by Saaksvuori, A. and Immonen, A. (2008), to the right Odoo take on how systems interact.
圖 74：比較左側為 Saaksvuori, A. 和 Immonen, A.（2008）理論化的適應圖表，右側為 Odoo 對系統互動的看法。

The lack of file upload support on things like operation items, work centers or equipment is something of some concern especially considering 3D printing or CNC because access to the CAD files would prove helpful to the operators. Also, there is a gap in between the facets of product and tool when the company is taking upon themselves to develop and produce said tooling (similar situation founded when developing the molds in the simulation).
對於操作項目、工作中心或設備等方面缺乏文件上傳支持，這點尤為令人擔憂，特別是考慮到 3D 打印或 CNC，因為操作人員能夠訪問 CAD 文件將會對其有所幫助。此外，當公司自行開發和生產該工具時，產品和工具之間存在一定差距（在模擬中開發模具時也遇到了類似的情況）。

In addition, although MES provide detailed graphical representation regarding the dataset that it has, it is limited to data derived from the time to completion of the operations been carried out. For instance, it would be very valuable if graphical representation regarding quality control was easily available as well.
此外，雖然 MES 提供了有關資料集的詳細圖形表示是的，它僅限於從完成操作的時間得出的數據執行。例如，如果有關的圖形表示非常有價值品質控制也很容易實現。

All that said, applying ECOs to BOMs in Odoo is a procedure deserving of praise. The ECO holds the information until it is ready to be applied and then it updates the BOM automatically once the ECO is validated by responsible personnel. It might not look like something so important now because this simulation is dealing with very simple products, but it becomes exponentially more important as complexity increases. E.g. A car with thousands of parts and hundreds of nested BOMs would be considered a nightmare to control and keep track of change if a system like this was not present.
儘管如此，在 Odoo 中將 ECO 應用於 BOM 是值得讚揚的程序。ECO 將信息保存，直到準備好應用，然後一旦負責人員驗證了 ECO，它就會自動更新 BOM。現在可能看起來不那麼重要，因為這個模擬處理的是非常簡單的產品，但隨著複雜性的增加，它的重要性會成倍增加。例如，一輛擁有數千個零件和數百個嵌套 BOM 的汽車，如果沒有這樣的系統，將被認為是一個難以控制且難以跟踪變更的噩夢。

This software is not perfect for PLM or MES implementation, but it does hold value in the sense of availability and integration with other systems. The functionality is there specially regarding product and process and the software has an extremely interesting integration with its natural ERP functionalities. All this makes up for a system that would suit better:
這個軟件並不完美用於 PLM 或 MES 的實施，但在可用性和與其他系統的集成方面具有價值。特別是在產品和流程方面，功能是存在的，而且軟件與其自然的 ERP 功能有著極為有趣的集成。所有這些組成了一個更合適的系統：

Small business that could use PLM and MES in a smaller scale.
小型企業可以在較小的規模中使用 PLM 和 MES。
Companies that deal with less manufacturing and more assembly or distribution taking advantage of the All in One nature of the software.
那些處理較少製造而更多組裝或分銷業務的公司，可以充分利用軟件的一體化特性。

It is important to mention that the limitations of Odoo are not in the complexity of the product itself but in the complexity of the operations that surround its development. All things considered you could track a large and complex assembly if it includes only simple manufacturing operations or if more complex engineering tasks are done by suppliers. I.e. you could track the assembly of a motorcycle with ease in Odoo, but the PLM features are not polish enough to track the full evolution/development of its powertrain. It is certainly possible to do so but it would take too much time and effort from the engineering team to be considered worth it just for the sake of having an all in one solution with ERP features.
重要的是要提到，Odoo 的限制不在於產品本身的複雜性，而在於其開發周圍操作的複雜性。總的來說，如果組裝過程僅包含簡單的製造操作，或者更複雜的工程任務由供應商完成，則可以追踪一個大型且複雜的組裝過程。例如，您可以在 Odoo 中輕鬆追踪摩托車的組裝過程，但 PLM 功能不足以跟踪其動力系統的全面演進/開發。這當然是可能的，但要從工程團隊中投入太多時間和精力，僅僅為了擁有一個包含 ERP 功能的一體化解決方案而不值得。