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This manuscript deals with a study of the organometallic catalysis within a dendrimer framework. Organometallic catalysis is one of the well-studied aspects involving the newly emerged class of dendritic macromolecules. However, in spite of the fact that a large number of catalysis studies performed using dendrimers, pertinent and compelling queries remained un-answered at large. The major queries were concerned with (i) the effect of clustering the organometallic moieties onto the dendrimers and (ii) the role of the dendritic structure on the observed catalytic profiles. In a sustained research programme on dendrimers, we have studied systematically and focused on the above queries. The studies were facilitated through the preparation of a large number of multivalent dendritic organometallic catalysts, wherein three generations of poly(ether imine) dendrimers were utilized. Preparation of several possible catalysts within each generation was also accomplished. In total, 11 catalysts were prepared involving zero, first and second generation of the poly(ether imine) dendrimers. The organometallic catalysis, pertaining to the C-C bond forming Heck coupling reaction and the Suzuki coupling reaction were undertaken to examine the catalytic efficiencies of the multivalent dendritic catalysts. The most important results of this study are that (i) an individual catalytic site is far more effective when it resides on a larger generation dendrimer than a lower generation dendrimer and (ii) within a particular generation, an individual catalytic site is more effective when it is present in a clustered environment.