**Lean practices**

**1.** **Understanding customer needs** (surveying and sharing to employees customers’ needs, expectations, satisfaction; transforming customer requirements into product characteristic; resolving customers' complaints) (Li et al., 2005; Narasimhan et al., 2006; Shah and Ward, 2007; Bhasin S., 2011; Hofer et al., 2011; Vinodh and Chintha, 2011a; Alsmadi et al., 2012; Dora et al., 2013; AL-Najem et al. 2013; Khanchanapong et al., 2014; Leyer and Moormann, 2014; Bortolotti et al. 2015a; Chavez et al., 2015; Jasti and Kodali, 2015a; Mund et al., 2015; Narayanamurthy and Gurumurthy, 2016; Sharma and Shah, 2016; Filho et al., 2016; Dun and Wilderom, 2016; Sajan et al. 2017; Tortorella and Fettermann, 2017; Tortorella et al., 2017).

**2. Customer involvement** (participating in the initial design process and product development, setting standards, giving feedback on quality and delivery performance, sharing current and future demand information) (Li et al., 2005; Narasimhan et al., 2006; Shah and Ward, 2007; Hofer et al., 2011; Alsmadi et al. 2012; Taylor et al., 2013; Azadegana et al. 2013; AL-Najem et al., 2013; Dora et al., 2013; Jasti and Kodali, 2014a; Khanchanapong et al., 2014; Jasti and Kodali, 2015a; Jasti and Kodali, 2015b; Bortolotti et al. 2015; Chavez et al. 2015; Filho et al., 2016; Birkie and Trucco, 2016; Narayanamurthy and Gurumurthy, 2016; Tortorella et al., 2017; Losonci et al., 2017; Ghobakhloo and Azar, 2018; Das, 2018).

**3. Establishment of value streams** (drawing and improving value stream maps of processes, identifying value-added and non value- added activities, setting key performance indicators for the activities) (Sezen et al., 2012; Leyer and Moormann, 2014; Jasti and Kodali, 2014a; Mund et al., 2015; Sisson and Elshennawy, 2015; Hu et al., 2015; Jasti and Kodali, 2015a; Jasti and Kodali, 2015b; Oliveira and Fernandes, 2017; Tortorella et al., 2017; Caldera et al., 2017; Satolo et al., 2017; Merwe, 2017; Isack et al., 2018; Galeazzo and Furlan, 2018; Das, 2018).

**4. Creating flows within the value streams** (avoiding a backlog of work, continuous flow of families of products, flow oriented plant and equipment layout, shop floor layout facilitating low inventories and fast throughput, removing bottlenecks/constraints, providing smaller and balanced batch sizes) (Shah and Ward, 2003; Papadopoulou and Ozbayrak, 2005; Narasimhan et al., 2006; Shah and Ward, 2007; Hallgren and Olhager, 2009; Rahman et al., 2010; Bhasin, 2011; Yang et al. 2011; Saurin et al., 2011; Furlan et al., 2011; Hofer et al., 2011; Vinodh and Chintha, 2011a; Vinodh and Chintha, 2011b; Hofer et al., 2012; Azadegana et al., 2013; Taylor et al., 2013; Nawanir et al., 2013; Dora et al., 2013; Khanchanapong et al., 2014; Leyer and Moormann, 2014; Jasti and Kodali, 2014a; Bortolotti et al., 2015a; Jasti and Kodali, 2015a; Jasti and Kodali, 2015b; Bortolotti et al., 2015b; Wiengarten et al., 2015; Narayanamurthy and Gurumurthy, 2016; Abolhassani et al., 2016; Filho et al., 2016; Birkie and Trucco, 2016; Sharma and Shah, 2016; Sajan et al. 2017; Satolo et al., 2017; Tortorella and Fettermann, 2017; Caldera et al., 2017; Losonci et al., 2017; Isack et al., 2018; Galeazzo and Furlan, 2018; Sahoo and Yadav, 2018; Tortorella et al., 2018; Panwar et al., 2018; Soliman et al., 2018).

**5. Cellular manufacturing** (creating groups-families of products with similar processing and designs, grouping dissimilar machines into work centers-cells based on product families, processes and machines in close proximity, optimum cell design)(Narasimhan et al., 2006; Shah and Ward, 2007; Fullerton and Wempe, 2009; Hallgren and Olhager, 2009; Bhasin, 2011; Hofer et al. 2011; Vinodh and Chintha, 2011a; Vinodh and Chintha, 2011b; Saurin et al., 2011; Hofer et al., 2012; Alsmadi et al. 2012; Dora et al., 2013; Taylor et al. 2013; Nawanir et al., 2013; Bortolotti et al., 2015a; Bortolotti et al., 2015b; Jasti and Kodali, 2015b; Filho et al., 2016; Narayanamurthy and Gurumurthy, 2016; Birkie and Trucco, 2016; Losonci et al., 2017; Tortorella and Fettermann, 2017; Caldera et al., 2017; Satolo et al., 2017; Merwe, 2017; Galeazzo and Furlan, 2018).

**6. Application of the pull approach through kanban system** (production is ‘pulled’ by the demand of the next station, next users, external customers or by the shipment of finished goods, utilizing Kanban cards for material movement and production sequencing) (Shah and Ward, 2007; Hofer et al., 2011; Saurin et al. 2011; Chauhan and Singh, 2012; Sezen et al. 2012; Hofer et al. 2012; Agus and Hajinoor, 2012; Alsmadi et al., 2012; Nawanir et al., 2013; Dora et al. 2013; Taylor et al. 2013; Leyer and Moormann, 2014; Jasti and Kodali, 2014a; Jasti and Kodali, 2015a; Jasti and Kodali, 2015b; Hu et al., 2015; Bortolotti et al. 2015a; Narayanamurthy and Gurumurthy, 2016; Filho et al., 2016; Abolhassani et al., 2016; Oliveira and Fernandes, 2017; Caldera et al., 2017; Merwe, 2017; Wickramasinghe and Wickramasinghe, 2017; Satolo et al., 2017; Tortorella et al., 2017; Losonci et al., 2017; Tortorella and Fettermann, 2017; Bevilacqua et al., 2017; Ghobakhloo and Azar, 2018; Galeazzo and Furlan, 2018; Sahoo and Yadav, 2018; Tortorella et al., 2018; Panwar et al., 2018; Das, 2018; Soliman et al., 2018).

**7. JIT-Purchasing and delivery by suppliers** (daily shipments, on-time and frequent delivery, suppliers’ warehouses/factories are located nearby company, placing small lot size orders to suppliers, sourcing multiple part families from a single supplier) (Narasimhan et al., 2006; Shah and Ward, 2007; Inman et al., 2011; Hofer et al., 2011; Bhasin, 2011; Alsmadi et al., 2012; Hofer et al., 2012; Taylor et al., 2013; AL-Najem et al., 2013; Nawanir et al., 2013; Dora et al., 2013; Green et al., 2014; Jasti and Kodali, 2014a; Khanchanapong et al., 2014; Jasti and Kodali, 2015b; Bortolotti et al., 2015a; Bortolotti et al., 2015b; Abolhassani et al., 2016; Birkie and Trucco, 2016; Filho et al., 2016; Sajan et al. 2017; Satolo et al., 2017; Tortorella and Fettermann, 2017; Ghobakhloo and Azar, 2018; Isack et al., 2018; Sahoo and Yadav, 2018; Tortorella et al., 2018; Panwar et al., 2018)

**8. JIT production and delivery** (small lot sizes; JIT-manufacturing, selling, information strategy; sharing production plans with suppliers; training in JIT; synchronization of processes; reducing inventory; distribution points close to the customers; producing products every day) (Sanchez and Perez, 2001; Shah and Ward, 2003; Li et al., 2005; Papadopoulou and Ozbayrak, 2005; Narasimhan et al., 2006; Shah and Ward, 2007; Pettersen, 2009; Rahman et al., 2010; Furlan et al., 2011; Vinodh and Chintha, 2011a; Vinodh and Chintha, 2011b; Inman et al., 2011; Saurin et al., 2011; Bhasin, 2011; Furlan et al., 2011; Sezen et al., 2012; Agus and Hajinoor, 2012; Alsmadi et al., 2012; Sezen et al., 2012; Chauhan and Singh, 2012; Nawanir et al., 2013; Jasti and Kodali, 2014a; Green Jr et al., 2014; Jasti and Kodali, 2015a; Jasti and Kodali, 2015b; Wickramasinghe and Wickramasinghe, 2017; Galeazzo and Furlan, 2018; Sahoo and Yadav, 2018; Tortorella et al., 2018; Panwar et al., 2018; Das, 2018).

**9. Top management commitment and involvement to lean approach** (top managers coordinate and set clear objectives, translate value into measurable product attributes and performance specifications, promote employees to managerial positions, accept responsibility for quality, evaluate management based on quality, communicate the importance of lean, communicate with stakeholders, ensure investment to help in lean, create and communicate a vision focused on quality, personally involved in quality improvement, substitute missing employees, identify exceptional people with excellent engineering and leadership skills, support team management for decision making, support management by encouraging, helping, coaching and listening)(Boyer, 1996; Bhasin, 2011; Vinodh and Chintha, 2011b; Saurin et al., 2011; Deflorin and Scherrer-Rathje, 2012; Duarte and Cruz-Machado, 2013; Taylor et al., 2013; AL-Najem et al., 2013; Jasti and Kodali, 2014a; Leyer and Moormann, 2014; Sisson and Elshennawy, 2015; Bortolotti et al., 2015a; Bortolotti et al., 2015b; Jasti and Kodali, 2015a; Jasti and Kodali, 2015b; Mund et al., 2015; Narayanamurthy and Gurumurthy, 2016; Tortorella and Fogliatto, 2017; Satolo et al., 2017; Galeazzo and Furlan, 2018; Gandhi et al., 2018; Soliman et al., 2018).

**10. Continuous improvement and value perfection** (CI throughout the year; regular meetings to discuss the actions to avoid problems; frequent inspection by autonomous defect control; rising trend of machine productivity and performance with low scrap and defects; improving all aspects of products and processes; tracking, communicating and measuring objectively the results of Lean and improvement changes; sharing employee ideas and best practices throughout the organisation; participating in national or global competitions for CI; establishing circles of CI; checking work results in detail; goal achievement) (Sanchez and Perez, 2001; Sim and Rogers, 2008; Pettersen, 2009; Bhasin, 2011; Saurin et al., 2011; Sezen et al., 2012; Chauhan and Singh, 2012; Deflorin and Scherrer-Rathje, 2012; Taylor et al., 2013; Longoni et al., 2013; Leyer and Moormann, 2014; Jasti and Kodali, 2014a; Bortolotti et al., 2015b; Jasti and Kodali, 2015a; Jasti and Kodali, 2015b; Narayanamurthy and Gurumurthy, 2016; Birkie and Trucco, 2016; Sharma and Shah, 2016; Caldera et al., 2017; Tortorella and Fettermann, 2017; Merwe, 2017; Wickramasinghe and Wickramasinghe, 2017; Satolo et al., 2017; Isack et al., 2018; Galeazzo and Furlan, 2018; Panwar et al., 2018; Das, 2018; Soliman et al., 2018).

**11. Total Productive Maintenance** (routine maintenance, cleaning and lubrication of all equipment, tools, machines and workspaces, following standardised procedures; detecting and treating abnormal operating conditions; maintaining records of maintenance; incorporating safety improvement programs in maintenance activities; monitoring the performance of equipment) (Shah and Ward, 2003; Papadopoulou and Ozbayrak, 2005; Shah and Ward, 2007; Rahman et al., 2010; Bhasin, 2011; Saurin et al., 2011; Hofer et al., 2011; Hofer et al., 2012; Sezen et al., 2012; Alsmadi et al., 2012; Dora et al., 2013; Azadegana et al., 2013; Nawanir et al., 2013; Jasti and Kodali, 2014a; Hu et al., 2015; Jasti and Kodali, 2015b; Bortolotti et al., 2015b; Abolhassani et al., 2016; Birkie and Trucco, 2016; Filho et al., 2016; Narayanamurthy and Gurumurthy, 2016; Chauhan, 2016; Sajan et al. 2017; Oliveira and Fernandes, 2017; Satolo et al., 2017; Caldera et al., 2017; Merwe, 2017; Bevilacqua et al., 2017; Tortorella and Fettermann, 2017; Losonci et al., 2017; Ghobakhloo and Azar, 2018; Galeazzo and Furlan, 2018; Sahoo and Yadav, 2018; Tortorella et al., 2018; Panwar et al., 2018; Das, 2018).

**12. Managing setup time reduction** (redesigning equipment; converting most of setup time to external time; using special tools, quick changeover techniques, standardised tasks and regular training; redesigning jigs or fixtures; monitoring production-cycle time; keeping work areas clean and tidy; 5S; employees performing their own setup) (Shah and Ward, 2007; Fullerton and Wempe, 2009; Rahman et al., 2010; Vinodh and Chintha, 2011b; Saurin et al., 2011; Hofer et al., 2011; Alsmadi et al., 2012; Hofer et al., 2012; Sezen et al., 2012; Dora et al., 2013; Nawanir et al., 2013; Taylor et al. 2013; Jasti and Kodali, 2014a; Bortolotti et al., 2015a; Jasti and Kodali, 2015b; Panwar et al., 2015; Bortolotti et al., 2015b; Hu et al., 2015; Narayanamurthy and Gurumurthy, 2016; Abolhassani et al., 2016; Birkie and Trucco, 2016; Sharma and Shah, 2016; Filho et al., 2016; Chauhan, 2016; Tortorella and Fettermann, 2017; Sajan et al., 2017; Merwe, 2017; Bevilacqua et al., 2017; Das, 2018; Isack et al., 2018; Panwar et al., 2018).

**13. Work standardisation** (Jobs, tasks, work instructions and training are specified in standard operating procedures, used in day-to-day work and updated regularly; design and product engineering standardization; audits, job observation and checklists are used to check compliance with work standards) (Pettersen, 2009; Saurin et al., 2011; Bhasin, 2011; Taylor et al., 2013; AL-Najem et al., 2013; Jasti and Kodali, 2014a; Mund et al., 2015; Jasti and Kodali, 2015a; Jasti and Kodali, 2015b; Hu et al., 2015; Sharma and Shah, 2016; Narayanamurthy and Gurumurthy, 2016; Birkie and Trucco, 2016; Sajan et al., 2017; Oliveira and Fernandes, 2017; Satolo et al., 2017; Losonci et al., 2017; Bevilacqua et al., 2017; Tortorella et al., 2017; Isack et al., 2018; Galeazzo and Furlan, 2018; Tortorella et al., 2018; Panwar et al., 2018; Das, 2018; Gandhi et al., 2018; Soliman et al., 2018)

**14. Use of quality tools and techniques** (using SPC, charts of defect rates, fish bone type diagrams, process capability studies, the 7 quality tools and design of experiments, to identify causes of quality problems, reduce process variability and determine whether the processes are in control) (Narasimhan et al., 2006; Shah and Ward, 2007; Fullerton and Wempe, 2009; Hofer et al., 2011; Vinodh and Chintha, 2011a; Sezen et al., 2012; Hofer et al., 2012; Chauhan and Singh, 2012; Alsmadi et al., 2012; Nawanir et al., 2013; Dora et al., 2013; Azadegana et al., 2013; Taylor et al., 2013; Hu et al., 2015; Bortolotti et al., 2015b; Jasti and Kodali, 2015a; Bortolotti et al., 2015a; Birkie and Trucco, 2016; Narayanamurthy and Gurumurthy, 2016; Filho et al., 2016; Sharma and Shah, 2016; Losonci et al., 2017; Satolo et al., 2017; Tortorella and Fettermann, 2017; Ghobakhloo and Azar, 2018; Galeazzo and Furlan, 2018; Panwar et al., 2018).

**15. Visual management** (production control board which is visible to all employees and displays planned and undertaken activities, the reasons for failing to comply with the schedule, quality related metrics, root causes of defects, and corrective actions; visual devices for calling the team leader; Andon cords to signal a concern on the assembly line; devices for detecting abnormalities and stopping production; visually defined maximum caps for all inventories)(Narasimhan et al., 2006; Saurin et al., 2011; Vinodh and Chintha, 2011a; Nawanir et al., 2013; Taylor et al., 2013; Fullerton et al., 2014; Jasti and Kodali, 2014a; Leyer and Moormann, 2014; Bortolotti et al., 2015a; Hu et al., 2015; Jasti and Kodali, 2015a; Jasti and Kodali, 2015b; Narayanamurthy and Gurumurthy, 2016; Birkie and Trucco, 2016; Oliveira and Fernandes, 2017; Satolo et al., 2017; Merwe, 2017; Isack et al., 2018; Galeazzo and Furlan, 2018; Panwar et al., 2018; Das, 2018; Soliman et al., 2018).

**16. Process management** (processes adding value for the customer by reducing all kind of waste, focusing on quality tools to enhance the success of lean activities, reviewing and designing processes to be preventive-oriented, understanding the concept of the “internal customer”, determining and documenting expected performance of all processes, re-arranging process modules for customization purposes, using the 6S methodology meaning 5S and safety) (Sanchez and Perez, 2001; Li et al., 2005; Papadopoulou and Ozbayrak, 2005; Saurin et al. 2011; Bhasin, 2011; Yang et al., 2011; Saurin et al., 2011; Deflorin and Scherrer-Rathje, 2012; Sezen et al., 2012; Sezen et al., 2012; AL-Najem et al., 2013; Duarte and Cruz-Machado, 2013; Nawanir et al., 2013; Khanchanapong et al,. 2014; Jasti and Kodali, 2015a; Jasti and Kodali, 2015b; Mund et al., 2015; Losonci et al., 2017; Sharma and Shah, 2016; Ayeni et al., 2016; Narayanamurthy and Gurumurthy, 2016; Sajan et al., 2017; Losonci et al., 2017; Ghobakhloo and Azar, 2018; Galeazzo and Furlan, 2018; Isack et al., 2018; Panwar et al., 2018; Das, 2018).

**17. Quality designed into the product - Integrated product design** (5s is integral in the product design, design-for-manufacture/assembly methods, mistakes proofing/Poka-Yoke, supplier and customer involvement in product development, concurrent engineering, strengthening the relationship between product and manufacturing engineers, job rotation between design and manufacturing engineering). (Narasimhan et al., 2006; Bhasin, 2011; Vinodh and Chintha, 2011b; Sezen et al., 2012; Mund et al., 2015; Jasti and Kodali, 2015a; Narayanamurthy and Gurumurthy, 2016; Abolhassani et al., 2016; Satolo et al., 2017; Bevilacqua et al., 2017).

**18. Quality problem-solving** (closed-loop quality problem solution, root cause problem solving, formulating cross-functional small teams to solve problems, stopping the production line to deal with the roots of the problem, dealing with the problems immediately, inspecting the quality of employee work) (Boyer, 1996; Bhasin, 2011; Deflorin and Scherrer-Rathje, 2012; Sezen et al., 2012; Nawanir et al., 2013; Khanchanapong et al., 2014; Bortolotti et al., 2015b; Mund et al., 2015; Narayanamurthy and Gurumurthy, 2016; Birkie and Trucco, 2016; Sharma and Shah, 2016; Sajan et al. 2017; Caldera et al., 2017; Wickramasinghe and Wickramasinghe, 2017; Losonci et al., 2017; Satolo et al., 2017; Isack et al., 2018; Galeazzo and Furlan, 2018; Tortorella et al., 2018; Soliman et al., 2018).

**19. Development and training of leaders, engineers, supervisors, shop floor employees** (providing training annually, in a clear concise manner with practical examples and quantifiable achievements; training in production process, improvement initiatives, engineering, problem-solving, Lean, leadership skills; using standardized initial training for new employees; adopting “learning-by-doing”; rewarding employees for learning new skills)(Boyer, 1996; Papadopoulou and Ozbayrak, 2005; Narasimhan et al., 2006; Sim and Rogers, 2008; Bhasin, 2011; Vinodh and Chintha, 2011a; Vinodh and Chintha, 2011b; Deflorin and Scherrer-Rathje, 2012; AL-Najem et al., 2013; Nawanir et al., 2013; Duarte and Cruz-Machado, 2013; Mund et al., 2015; Sisson and Elshennawy, 2015; Jasti and Kodali, 2015a; Narayanamurthy and Gurumurthy, 2016; Sharma and Shah, 2016; Wickramasinghe and Wickramasinghe, 2017; Satolo et al., 2017; Bevilacqua et al., 2017; Chauhan, 2016; Satolo et al., 2017; Isack et al., 2018; Galeazzo and Furlan, 2018; Das, 2018; Gandhi et al., 2018; Soliman et al., 2018).

**20. Multifunctionality of employees and teams and cross-training** (employees are rotated among jobs frequently and cross-trained to perform a variety of activities; many tasks are performed by teams; cross-project interaction and exchange of information; cooperation and intensive communication between cross-functional teams) (Sanchez and Perez, 2001; Narasimhan et al., 2006; Hofer et al., 2011; Saurin et al., 2011; Vinodh and Chintha, 2011a; Vinodh and Chintha, 2011b; Chauhan and Singh, 2012; Dora et al., 2013; Duarte and Cruz-Machado, 2013; Khanchanapong et al., 2014; Jasti and Kodali, 2014a; Mund et al., 2015; Jasti and Kodali, 2015a; Jasti and Kodali, 2015b; Sisson and Elshennawy, 2015; Narayanamurthy and Gurumurthy, 2016; Chauhan, 2016; Sharma and Shah, 2016; Birkie and Trucco, 2016; Wickramasinghe and Wickramasinghe, 2017; Satolo et al., 2017; Bevilacqua et al., 2017; Tortorella and Fettermann, 2017; Ghobakhloo and Azar, 2018; Galeazzo and Furlan, 2018; Tortorella et al., 2018; Panwar et al., 2018; Gandhi et al., 2018).

**21. Decentralization** (authority, responsibility and financial power are delegated at different levels, communicated and published; workload is equally distributed at different levels) (Bhasin, 2011; Chauhan and Singh, 2012; Narayanamurthy and Gurumurthy, 2016; Sharma and Shah, 2016).

**22. Employee responsibility** (for noticing anything odd about functionality, participating in problem-solving process, planning) **and autonomy** (to control process and product variability, stop production if abnormalities - quality problems occur, call team leader and support areas, pull Andon cords to signal a concern on the assembly line) (Boyer, 1996; Papadopoulou and Ozbayrak, 2005; Saurin et al., 2011; Deflorin and Scherrer-Rathje, 2012; Taylor et al., 2013; Nawanir, et al., 2013; Taylor et al., 2013; Dun and Wilderom, 2016; Wickramasinghe and Wickramasinghe, 2017; Losonci et al., 2017).

**23. Employee involvement in quality management** (root out lean and green waste, explore new ways and suggest innovative ideas, design processes, participate in problem-solving teams, eliminate problems, lead product/process improvements, drive suggestion programs) (Boyer, 1996; Shah and Ward, 2007; Sim and Rogers, 2008; Fullerton and Wempe, 2009; Bhasin, 2011; Hofer et al., 2011; Vinodh and Chintha, 2011b; Deflorin and Scherrer-Rathje, 2012; Sezen et al., 2012; Dora et al., 2013; Nawanir et al., 2013; Duarte and Cruz-Machado, 2013; Azadegana et al., 2013; Bortolotti et al., 2015b; Jasti and Kodali, 2015a; Filho et al., 2016; Narayanamurthy and Gurumurthy, 2016; Caldera et al., 2017; Wickramasinghe and Wickramasinghe, 2017; Tortorella and Fettermann, 2017; Losonci et al., 2017; Bevilacqua et al., 2017; Ghobakhloo and Azar, 2018).

**24. Supplier partnership** (visits to and from suppliers frequently, long-term cooperative relationships, mutual trust, joint investments, strategic alliances with few high quality suppliers) **and involvement** (in problem solving, quality and cost improvement, planning and goal setting, new product development, lean initiatives, marketing plans).(Sanchez and Perez, 2001; Li et al., 2005; Papadopoulou and Ozbayrak, 2005; Narasimhan et al., 2006; Shah and Ward, 2007; Inman et al., 2011; Hofer et al., 2011; Alsmadi et al., 2012; Hofer et al., 2012; AL-Najem et al. 2013; Nawanir et al., 2013; Dora et al., 2013; Duarte and Cruz-Machado, 2013; Taylor et al., 2013; Khanchanapong et al., 2014; Jasti and Kodali, 2014a; Green Jr et al., 2014; Bortolotti et al., 2015b; Bortolotti et al., 2015a; Jasti and Kodali, 2015b; Chavez et al., 2015; Mund et al., 2015; Jasti and Kodali, 2015a; Piercy and Rich, 2015; Filho et al., 2016; Narayanamurthy and Gurumurthy, 2016; Birkie and Trucco, 2016; Sharma and Shah, 2016; Sajan et al. 2017; Merwe, 2017; Bevilacqua et al., 2017; Tortorella and Fettermann, 2017; Tortorella et al., 2017; Ghobakhloo and Azar, 2018; Galeazzo and Furlan, 2018; Panwar et al., 2018; Das, 2018).

**25. Providing feedback to suppliers** (giving regular and detailed feedback on quality and delivery performance, design changes, customer future needs and firm future strategy; making suggestions to suppliers) (Sanchez and Perez, 2001; Shah and Ward, 2007; Hofer et al., 2011; Alsmadi et al., 2012; Hofer et al., 2012; AL-Najem et al., 2013; Taylor et al., 2013; Azadegana et al., 2013; Green et al., 2014; Bortolotti et al., 2015a; Bortolotti et al., 2015b; Mund et al., 2015; Jasti and Kodali, 2015a; Filho et al., 2016; Tortorella and Fettermann, 2017)

**26. Supplier development** (technological and financial assistance, training in quality issues, improving capabilities, integration of new SCM) **and evaluation** (on the basis of total cost, quality and delivery) (Papadopoulou and Ozbayrak, 2005; Li et al., 2005; Narasimhan et al., 2006; Shah and Ward, 2007; Hofer et al., 2011; Vinodh and Chintha, 2011b; Hofer et al., 2012; Alsmadi et al., 2012; AL-Najem et al., 2013; Taylor et al., 2013; Nawanir et al., 2013; Nawanir et al., 2013; Green Jr et al., 2014; Chavez et al., 2015; Jasti and Kodali, 2015a; Mund et al., 2015; Narayanamurthy and Gurumurthy, 2016; Filho et al., 2016; Birkie and Trucco, 2016; Tortorella and Fettermann, 2017; Merwe, 2017; Satolo et al., 2017; Soliman et al., 2018).

**27. Information exchange between the company and trading partners and suppliers** (timely, accurate, complete, adequate and reliable information exchange regarding production schedule, cost, business units’ proprietary information, changing needs, knowledge of core business processes, business planning) (Sanchez and Perez, 2001; Li et al., 2005; Papadopoulou and Ozbayrak, 2005; Narasimhan et al., 2006; Narayanamurthy and Gurumurthy, 2016; Sajan et al. 2017; Bevilacqua et al., 2017).